San Jose
Medical Center

Seismic Evaluation

Memorandum

To: Tom May CEO - Pacific Northwest Division

CC: William Gilbert CEO, Steve Sisto, COO, David Suarez, Wayne Price

From: Gene Hildman, Group Engineering Manager Gene Hildman

Date: Monday December 29, 1997

Re: Facility Condition - Finical Impact - San Jose Med.Ctr.

Physical Plant Evaluation

As per your request the following are some basic condition statements and financial impact numbers that should help your decision as to restore or replace the majority of the buildings at Columbia/HCA San Jose Medical Center. Other financial and operational impact issues are also discussed.

A tour was made of the entire facility from top to bottom, inside and out and found it to be very deceiving from the outside. First impression when driving up to the campus, is that the buildings have been kept in remarkable condition. It would seemed foolish to replace such well kept buildings. A recent exterior paint job did wonders for the facility. However, after consulting with the staff and reviewing the interior of the buildings, it became very evident that most buildings at this campus are not candidates for restoration and that all of the acute care operations must be replaced. The conditions considered are:

- **AGE & VENTAGE OF BUILDINGS**
- **STRUCTRUAL CONDITIONS**
- **SEISMIC UPGRADE REQUIREMENTS**
- **ASBESTOS ABATEMENT**
- **ADA UPGRADE REQUIREMENTS**
- **DETERIATED CONDITION OF PHYSICAL PLANT EQUIPMENT SYSTMES & INTERSTURCTURE**
- **AGE & OBSOLETE CLINICAL & SUPPORT EQUIPMENT**

Based on the SMP report of October 1997 it appears that it would cost about $45,000,000.00 to seismically upgrade the facility, excluding equipment replacement and construction costs. This would still not have "Right Sized or

Located Key Services" and departments to best serve our customers in this multi-ventage campus constructed over the past 75 years.

Only three buildings appear to be candidates for salvation from the "Wrecking Ball" and then none would be eligible for housing Acute Care patients for long term, unless a seismic upgrade was completed. After close evaluation it appears that the entire acute care facility, with the exception of the following, would need to be replaced.

1. 1968 - 83,000 Sq. Ft. **"Oaks"** building currently housing SUN/PACIFIC Center, Rehab and Oncology/Medical. This building could be used for soft services until year 2030.

2. 1980 - 34,200 Sq. Ft. **"Rad Lab"** building which is housing a very large Market Area Lab and all Radiology for the facility.

3. 1986 - 7,200 Sq.Ft. **"Landmark"** building which houses main lobby and professional staff of the Hospital.

Our consultant, SMP conducted a comprehensive Facilities Planning Study in October of 1997 of which has been reviewed in great detail. Major components of the report are Due Diligence, Planning and Appendices. The report is an excellent report and covers the Structural Issues, Mechanical and Electrical Systems, Architectural Narrative and a Cost Model. It appears that the report is a conservative report of the actual conditions of systems through out the campus.

Columbia/HCA San Jose Medical Center consists of numerous Acute Care and Non-acute Care Buildings constructed between the 1920's to the 1980's. Most have been substantially altered or remodeled since their original dates of construction. Oldest sections (59,000 sq. ft.) was constructed 75 years ago.

Most of the issues are **CODE** related regarding the Seismic Assessment (Senate Bill 1953) of the Acute Care Buildings on the campus that are governed by the Office of Statewide Health Planning & Development (OSHPD). Others are **OPERATIONAL** requirements that will effect the comfort and safety of the patients, visitors, healthcare providers and employees of San Jose Medical Center.

Note: Many of the JCAHO Life Safety Code issues will need to be identified in the Statement of Condition and Part IV (Corrective Action Plan) will be need to reflect "Facility Replacement in the next 36 months" as an acceptable action plan using some Interim Life Safety Action items to compensate for the deficiencies.

STRUCTURAL NARRATIVE

Site Seismicity

San Jose Medical Center is located in a region of high seismicity. Located approximately 12 miles from the San Andreas Fault, and 9 miles from the southern segment of the Hayward Fault, the site is jut outside the near fault zones of two major faults in the immediate vicinity. The site is also located approximately 5 miles from the Calaveras Fault.

Building Evaluations

SB-1953 requires that each hospital provide structural and non-structural evaluation reports to OSHPD by July 1, 2001. Acute care buildings which do not provide adequate protection for life-safety must be strengthened, replaced, or taken out of acute care service by 2008. By 2030, all existing buildings must substantially meet the requirements of the structural provisions of the Alquist Hospital Seismic Safety Act requirements of the structural provision of the Alquist Hospital Seismic Safety Act (HSSA). The intent of the Alquist HSSA is that acute care buildings possess sufficient seismic strength such that the buildings can be used to provide continuous emergency care after a major earthquake.

See the attached "Table 1 Evaluation Summary" of SMP Due Diligence Report.

See "Building History" Ventage Page

See "Building Construction Type" Page

See "Building Description and Services Provided per Building" page

MECHANCIAL AND ELECTRICAL SYSTEMS

The SMP report gives a good detailed report of each of the systems. However, we offer several specific comments.

1. **HVAC - CHILLED & HOT WATER PIPEING** -- The orginal hospital (1923 and 1940, 1955, and 1963 additions) did not have Air Condition installed with the orginal construction. It had only heat and it was by Steam Radiators. In approximately the late 1960's the hospital became Air Conditioned by installing "TWO PIPE" Hot and Chilled Water - Heating and Cooling System. This was done by run piping down the out side of the building and exposing the piping system to the elements. This system was covered with vertical panels to camouflage the piping, however, the elements have taken a toll on the system and have caused severe damage to the insulation and piping. Much of the piping is now leaking and major expensive repairs are being made regularly. It is simply not feasible to replace the entire system.

2. **ROOF TOP AIR HANDLERS** - Since Air Conditioning was added to the Hospital in later years there was no plans or space for Air Handlers inside the

Hospital. Therefore, all Air Handlers were installed on top of the roof. See attached pictures. Most are indoor units that were installed outside and are now in poor to bad condition and some must be replaced this year. Several more will not make it through the next few years. There are approximately **125 roof top units.**

3. **DOMESTIC WATER LINES** - Interior water lines are corroded and are causing sever leaks through out the hospital and on many occasions have caused floods causing far more damage then the material cost of the repairs to the piping. It is simply not feasible to replace the entire system.

4. **SANITARY SEWER LINES** - Lines above ceilings in the original building are in bad condition and have also caused considerable damage due to collapse and flooding of the building. Not only is this causing physical damage to the building but is a considerable health threat to patients, visitors and employees. It is simply not feasible to replace the entire system.

5. **MEDICAL AIR COMPRESSOR SYSTEM** - Units do not meet Code requirements are in bad condition and need to be replaced in it's entirety.

6. **MEDICAL VACUUM SYSTEM** - Units are in bad condition and are in need of replacement.

7. **BOILERS AND STEAM SYSTEM** - Entire System is very old, in bad condition and does not meet current code requirements. Only one boiler is allowed to run due to code requirement deficiencies. See pictures of System. System is very old and expensive to operate and impossible to maintain. With new technology and the State of the Art Equipment today, we would not install Steam Boilers in a central plant in the San Jose area. We would use Hot Water Heating Boilers and Point of Use Steam were required and Electric Hot Water Boosters in kitchen areas where necessary. Utility Gas Costs, Operation and Maintenance cost would be cut by an estimated 40% with a new Central Boiler Plant. It is impracticable to replace the system at this time.

8. **ELECTRICAL DISTRIBUTION SYSTEM** - System is very old and parts are no longer available. Most systems are so old and brittle that Maintenance Staff fear doing much maintenance on the system because the slightest movement in many cases will cause severe damage to the system and with no parts available the likely hood of getting the system back up is slim. It impracticable to replace the system.

9. **NURSE CALL SYSTEMS** - Many old systems in the building are in need of replacement.

10. **TELEPHONE SYSTEM** - System is in such bad condition that it will have to be replaced within the next year.

11. **ASBESTOS** - Several buildings are full of asbestos and much of it in the Central Boiler Plant and is Friable and in need of abatement. (See attached Pictures) In order to meet OSHA requirement, all of the friable material must be removed and reinstalled at once. This can be hazardous to the health of the plant operators and maintenance staff. It is our understanding the hospital has plans on taking care of emergency abatement the first of 1998. Total facility abatement cost is estimated at $1.75 million. It is my understanding that a Charitable Foundation has agreed to donate $875,635 to contribute toward the removal of the asbestos abatement program.

12. **AMERICAN DISABILITIES ACT** - Very little of the building is in compliance with the ADA and under and Major Construction in the facility that area would have be come into compliance.

13. **KEY SERVICE UNITS** - Key Service Units such as the ER, OR's, ICU, Delivery Room's LDR's, Nursery etc. do not lend to good flow and operating conditions for patients and healthcare workers.

LIFE SAFETY

Many Life Safety issues are too costly to consider for correction. In fact, many are of such that they could not be resolved with out closing down the hospital.

The only way this facility will be able to pass the JCAHO inspection will be by identifying the issues on the Statement of Condition as a violation of the Life Safety Code and then completing the Part IV action plan as Plan of Correction is to replace the facility in the next 30-36 months. Therefore, according to the information obtained, by the time of the next JCAHO we will have to inform the survey team of our plans to replace the facility due to the amount of deficiencies not meeting the Local AHJ. (Local Authority Having Jurisdiction)

We must have the replacement plans in process under way by no later then July 1998, i.e. Construction in process, at the next survey in 2001 or we will could possibly receive a Conditional Accreditation in addition to meeting the requirements of SB-1953 by 2008.

If required, pricing for the aforementioned items can be produced. However, with the seismic upgrade cost and these costs, our time would be better spent on a proposal for a replacement facility.

If you have any questions or comments, please do not hesitate to call.

Assumption #3:
Do not build a new Mother/Baby and/or Medical Surgical Tower prior to beginning Seismic Upgrades to the Existing Tower

Impact of seismic retrofit on existing hospital:
Basement

- Offices Relocation
- Reconfiguration of General Stores
- Relocate Men's and Women's Locker Room across from Kitchen
- Relocate Physician's Dining Room
- Install temporary walls in halls
- *Questions exist regarding doors through new sheer walls in several locations*

First Floor

- Install new Lobby under current hospital covered driveway entry
- Temporary relocation of up to five administrative offices
- Partial closure of Physician Lounge, Medical Records Dictation Rooms and Exterior EXIT door
- Temporary relocation of the Medical Records Director and Assistant Director offices
- Temporary relocation of bulk of Nursing Administration offices
- Redesign of Pharmacy and Nuclear Medicine departments
- Temporary relocation of a small portion of EEG/EKG department
- Potential elimination of PT/OT rear hall way door
- Temporary and possibly permanent relocation of exterior Admitting department entry door
- Temporary narrowing at several hallway locations during work

Second Floor

- Loose 16 Postpartum Beds for up to six months during construction on the East side of Tower
- Close the entire second floor (all of Mother/Baby) during the construction on the West side of the Tower

Third Floor

- Relocate Pediatric Department to 3-West during construction on the East side of the Tower
- Temporary elimination of (26) 3-West Medical Surgical Beds for up to one year

Fourth Floor

- Close sixteen (16) Telemetry beds during construction on the East side of the tower
- Close eighteen (18) Telemetry beds during construction on the West side of the tower
- Wire additional West side rooms in the existing tower for Telemetry

Fifth Floor

- Close (16) Medical/Surgical beds during construction on the East side of the tower

- Close eighteen (18) Medical/Surgical beds during construction on the West side of the tower

Impact:
Temporary loss of 100+ Beds for up to twelve months

Close eighteen (18) Medical/Surgical beds during

Assumption:
New Mother/Baby Unit adjacent to existing hospital consisting of 32 Mother/Baby beds

Impact of seismic retrofit on existing hospital:
Basement

- Offices Relocation
- Reconfiguration of General Stores
- Relocate Men's and Women's Locker Room across from Kitchen
- Relocate Physician's Dining Room
- Install temporary walls in halls
- *Questions exist regarding doors through new sheer walls in several locations*

First Floor

- Install new Lobby under current hospital covered driveway entry
- Temporary relocation of up to five administrative offices
- Partial closure of Physician Lounge, Medical Records Dictation Rooms and Exterior EXIT door
- Temporary relocation of the Medical Records Director and Assistant Director offices
- Temporary relocation of bulk of Nursing Administration offices
- Redesign of Pharmacy and Nuclear Medicine departments
- Temporary relocation of a small portion of EEG/EKG department
- Potential elimination of PT/OT rear hall way door
- Temporary and possibly permanent relocation of exterior Admitting department entry door
- Temporary narrowing at several hallway locations during work

Second Floor

- Relocate all second floor services to the first floor of the new tower

Third Floor

- Relocate Pediatric Department to 3 West
- Temporary elimination of (26) 3-West Medical Surgical Beds

Fourth Floor

- Close sixteen (16) Telemetry beds during construction on the East side of the tower
- Close eighteen (18) Telemetry beds during construction on the West side of the tower
- Wire additional West side rooms in the existing tower for Telemetry

Fifth Floor

- Close (16) Medical/Surgical beds during construction on the East side of the tower
- Close eighteen (18) Medical/Surgical beds during construction on the West side of the tower

Impact:
Temporary loss of 58 to 64 Beds for up to twelve months

Assumption #1
New Tower consisting of 32 Mother/Baby beds, 64 Medical Surgical beds.

Impact of seismic retrofit on existing hospital:
Basement

- Offices Relocation
- Reconfiguration of General Stores
- Relocate Men's and Women's Locker Room across from Kitchen
- Relocate Physician's Dining Room
- Install temporary walls in halls
- *Questions exist regarding doors through new sheer walls in several locations*

First Floor

- Install new Lobby under current hospital covered driveway entry
- Temporary relocation of up to five administrative offices
- Partial closure of Physician Lounge, Medical Records Dictation Rooms and Exterior EXIT door
- Temporary relocation of the Medical Records Director and Assistant Director offices
- Temporary relocation of bulk of Nursing Administration offices
- Redesign of Pharmacy and Nuclear Medicine departments
- Temporary relocation of a small portion of EEG/EKG department
- Potential elimination of PT/OT rear hall way door
- Temporary and possibly permanent relocation of exterior Admitting department entry door
- Temporary narrowing at several hallway locations during work

Second Floor

- Relocate all second floor services to the first floor of the new tower

Third Floor

- Move Medical/Surgical Department Beds to second floor of new tower (26)
- Temporary relocation of Pediatrics department beds to 3W (22)

Fourth Floor

- Relocate sixteen (16) Telemetry beds to the new tower during construction on the East side of the existing tower
- Relocate eighteen (18) Telemetry beds to the new tower during construction on the West side of the existing tower
- Wire additional West side rooms in the existing tower for Telemetry

Fifth Floor

- Relocate (16) Medical/Surgical beds to new tower during construction on the East side of the existing tower
- Relocate eighteen (18) Medical/Surgical beds to the new tower during construction on the West side of the existing tower

Possible temporary loss of up to four beds during a portion of renovation project

November 11, 1997

Mr. Steve Sisto
Director, Support Services
SAN JOSE MEDICAL CENTER
675 East Santa Clara Street,
San Jose, CA 95154

Subject: ***Senate Bill 1953 Update***

Dear Steve:

Many of our clients have called requesting the status of Senate Bill 1953 and they are asking some very important questions.

I am Chairman of the Health Facilities Committee, American Institute of Architects California Council. The committee has been working with OSHPD over the past eight (8) months developing a booklet of guidelines and procedures directed towards architects, engineers and hospitals. The booklet will focus on effective adherence procedures and will be helpful in determining <u>only those criteria necessary</u> to comply with the law. The committee hopes to have the booklet published sometime during the first quarter of 1998.

It is apparent that there is some false information and several rumors floating around regarding the when's, how's and costs required to comply with SB 1953. We at Puchlik/Dell Architects feel it is both helpful and important to share these questions and answers with all our health care clients.

Questions and Answers:

1. **<u>What is the purpose of SB 1953?</u>**

   After the Northridge Earthquake, it was determined and brought to the attention of State Legislature that over 70% of the hospitals in the State of California would not be able to provide reasonable services to the public after a major seismic event. Therefore, Senate Bill 1953 (SB 1953) was passed. This bill amended the Hospital Seismic Safety Act and developed two new parts for regulation of the bill. Part 1 consists of structural evaluation procedures, and part 2 consists of implementation of the regulations. The intent is to require a reasonable transition for all hospitals to meet and be in full compliance with the Alfred E. Alquist Hospital Seismic Safety Act of 1983 by the year 2030.

2. **Have the SB1953 regulations been approved, and are they currently in effect?**

Only Part 1 of the 2 parts of SB 1953 has been approved as of this date.

Part 1 *Establishes the definitions of earthquake performance categories and specifies what those categories include. It also defines two (2) seismic evaluation procedures.*

This part was approved by the Building Standards Commission on March 18, 1997 and is in affect today.

Part 2 *Defines the seismic retrofit building standards to which hospitals must comply when retrofitting older hospital buildings. Also included, are administrative regulations outlining the procedures for hospital owners to submit seismic evaluation reports, compliance plans and schedules to OSHPD by the January 1, 2001..*

This part has not been approved and is still under review by OSHPD and the Building Standards Commission.

3. **Should we currently be complying with the SB 1953 regulations?**

No. Part 2 of the bill is still under development. There are also on going changes being made that will help define necessary hospital compliance with the law. Many of these changes have already occurred within the past 2 months and will help in fixing the limits of necessary information and work as related to the architect and/or structural engineer.

4. **What are SPC ratings?**

SPC are Structural Performance Categories. (Please refer to the attached Table 2.5.3 for specifics.)

5. **What are NPC ratings?**

NPC are Nonstructural Performance Categories. (Please refer to the attached Table 11.1 for specifics.)

6. **Are we required to upgrade the mechanical and electrical systems if we do a structural upgrade?**

No. SB 1953 refers to seismic upgrades only. MEP upgrades or program changes are not required. However, there will be necessary upgrades required for seismic anchoring of communication systems, alternative power sources, bulk medical gas systems and/or fire alarm and safety systems This will be a requirement of NPC 2 and will need to be completed by January 1, 2002.

7. **<u>Our hospital is in the process of developing a strategic plan. Should we review SB 1953 now in order to determine which buildings will need to be removed or can be saved?</u>**

<u>Yes</u>. We recommend that a minimum study be done at this time to determine the year the structures were built. This will help determine the SPC rating for each building.

- *Structures built before 1973 will more than likely fall into the SPC 1 category.*
- *Structures built between1973 and 1983 could be within the SPC 2 category.*
- *Any building with a SPC 1 rating will be costly to upgrade to a SPC 2 rating. The cost and upgrades will vary depending on the type of construction and height of structure. (A study has shown that by the year 2008 over 1,000 buildings will be removed from the acute hospital service.)*

8. **<u>We are considering a merge or sale of our hospital. The buyers are asking how the hospital conforms and/or meets compliance with SB 1953. What do you recommend we do?</u>**

You may want to do a little more study on the structural systems. However, if the structure was built prior to 1973, it will more than likely not be economically feasible to keep the structure as an acute hospital. Structures built between 1973 and 1983 may require some upgrade that will allow the building to be used as an acute to the year 2030. You may want to get an idea of the range of costs for that upgrade. This will require a preliminary analysis of the structure making some assumptions as to the building's systems.

9. **<u>It is our understanding that ONLY certain departments are required to comply with SB 1953?</u>**

<u>Yes</u>. (See attached list.)

10. **<u>If I have Skilled Nursing, Rehabilitation and/or other services that are not affected by SB 1953, can these departments be housed in a SPC 1 rated building?</u>**

<u>Yes.</u> Skilled nursing, rehab and non-critical care service departments can be housed in a SPC 1 rated building. However, all "Critical Care Services" as outlined on the attached list cannot be linked and/or attached to a SPC 1 rated building after 2008 . This means that the "Critical Care Services" buildings MUST be separated by seismic joints and the utility lines that service these critical areas can not pass though a SPC 1 rated building.

11. Then SB 1953 will allow us to keep SPC 1 buildings?

Yes. If the buildings meet the following criteria:

- Seismic joints between buildings.
- Critical care services and utility lines do not pass though the SPC 1 rated building.
- The SPC 1 rated buildings can not affect the function of a SPC 2 or higher rated buildings.
- The SPC 2 or higher rated buildings do not exit thought the SPC 1 building.

Should you have any other questions, comments or require assistance in your building analysis, please to not hesitate to give us a call.

Sincerely,
PUCHLIK/DELL ARCHITECTS

Gerald Puchlik

Gerald Puchlik, AIA
Principal

GP/bs

Enclosure: Structural Performance Categories Table 2.5.3.
Nonstructural Performance Categories Table 11.1.
List of Departments affected by SB 1953.

DETAILED SB 1953 EVALUATION

for

The Oaks Building, "Building 500"

Located at

San Jose Medical Center

675 East Santa Clara Street,
San Jose, California

Prepared for:

San Jose Medical Center

675 East Santa Clara Street,
San Jose, California

APRIL 13, 2000

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Project No. 275097

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Executive Summary

This report summarizes the procedures and findings of the Senate Bill (SB) 1953 seismic evaluation of the Oaks Building at San Jose Medical Center located at 675 East Santa Clara Street, San Jose, California. The purpose of this study is to review the existing building conditions to determine the Structural Performance Category (SPC) and to identify existing SPC structural deficiencies. This report also seeks to inform HCA – The Healthcare Company and the hospital management about the likely impact of SB 1953 on system operations and potential use limitations at the San Jose Medical Center.

The Oaks Building was built circa 1967. The facility is an acute care facility as defined in SB 1953. The building is a three-story reinforced concrete structure with cast-in-place and precast concrete walls and cast-in-place concrete columns with a system of integral concrete beams and structural concrete slabs spanning between either the concrete beams or precast concrete walls. The building is supported by a mat foundation that encompasses the entire building footprint. The building dimensions in the north-south and the east-west directions are 242 feet and 140 feet, respectively, and the typical floor to floor height is 10.5 feet. The central courtyard dimensions in the north-south and the east-west directions are 65 feet and 54 feet, respectively.

The structural capacity of two of the buildings shear walls appears inadequate to resist the seismic forces imposed by the SB 1953 requirements. Furthermore, numerous shear wall elements do not have the required jamb reinforcement to comply with SB 1953 requirements. A final deficiency of the building is its lack of steel reinforcement around the openings in the slabs at the central portion of the building. The building is therefore categorized as SPC 1, which is described in Appendix A.

1. Introduction

1.1 General

This report presents the findings of the seismic evaluation of the Oaks Building at San Jose Medical Center located at 675 East Santa Clara Street, San Jose, California. The purpose of this study is to assess the probable seismic performance of the building providing licensed acute care services and determine the building's seismic performance category.

Office of Statewide Health Planning and Development (OSHPD) has developed procedures and criteria for implementing Senate Bill (SB) 1953. The California Building Standards Commission (CBSC) approved an evaluation procedure manual on March 18, 1997. The evaluation procedures are based on FEMA 178 *Handbook for Seismic Evaluation of Existing Buildings.*

This report constitutes a first step in complying with the requirements of SB 1953 Regulations and will allow the HCA - The Healthcare Company to develop an understanding of the likely impact of SB 1953 Regulations on system operations and to plan for necessary actions. These actions may include continued operations, upgrading deficient facilities, or constructing replacement facilities when upgrading is not feasible or desirable.

1.2 SB 1953 Background

The California Legislature passed the Alfred E. Alquist Hospital Facilities Seismic Safety Act in 1973 following the 1971 San Fernando Earthquake in which many hospitals were damaged. The Act specified a design and review process that was more stringent than required for the design of conventional structures.

Results from the 1994 Northridge Earthquake resulted in major structural damage to hospitals constructed prior to the Alquist Act and lesser damage to those constructed after 1973. This demonstrated that hospitals constructed prior to the Alquist Act were more vulnerable to earthquakes than those constructed after the Act. Results from the Northridge Earthquake also demonstrated that architectural, electrical, and plumbing systems were vulnerable to earthquake motion from an operations standpoint. Hospitals constructed both before and after passage of the Alquist Act systems suffered damage that prevented continued operations after the Northridge earthquake.

By enacting SB 1953, the State of California took additional steps to disclose the expected earthquake performance of hospital buildings to the public, require retrofit or replacement of buildings that are at risk of collapse during an earthquake, and require seismic upgrade of equipment and nonstructural systems to improve the ability of hospitals to remain operational.

SB 1953 requires that hospital owners conduct a seismic evaluation of their acute care facilities. Appendix A shows detailed descriptions on the SB 1953 background and definitions of SPC.

2. Detailed Structural Evaluation

2.1 General

The Oaks Building is an acute care facility as defined in SB 1953 and was built circa 1967. The building is a three-story, reinforced concrete structure with cast-in-place and precast concrete walls and concrete columns with a system of integral concrete beams and structural concrete slabs spanning between either the concrete beams or precast concrete walls. The building is supported by a mat foundation that encompasses the entire building footprint. The building is classified under the SPC 1 category.

2.2 Building Description

Designed in 1967 by Architect William E. Short, the building is a rectangular shaped three-story reinforced concrete building with a courtyard located near the center of the building. The building dimensions in the north-south and the east-west directions are 242 feet and 140 feet, respectively, and the typical floor heights are 10.5 feet. The central courtyard dimensions in the north-south and the east-west directions are 65 feet and 54 feet respectively. In the center of the building is a courtyard that is approximately 65 feet across by 54 feet long creating an opening in the center of the building and mat foundation.

Its roof and floor framing consists of a seven to eight inch thick concrete slab supported by either precast concrete wall panels or integral concrete beams that are supported by reinforced concrete columns. Numerous precast and cast-in-place concrete shear walls are found in the building. The foundation of the building consists of a mat foundation with stiffening beams.

The horizontal roof and floor diaphragms transfer the lateral loads to the shear walls. The concrete shear walls serve as the primary lateral load-resisting system in the north-south and the east-west directions.

2.3 Criteria for Review

The SB 1953 criteria is intended to provide consistent methods and quantifiable procedures to evaluate buildings and building components and to identify life safety hazards. The evaluation of the acute care facilities is based on SB 1953 procedures, which utilize FEMA 178 as a source document. The procedures for building evaluation involve sets of true and false evaluation statements (SB 1953, Appendix A) for the lateral force resisting system, foundation and geologic hazards, and elements that are not part of the lateral force resisting system. As directed by the procedure, each statement is answered by visual observation, review of documents, and/or simplified analysis. If a statement is determined to be false, the procedure may specify that a more detailed analysis be performed. The detailed analysis may "mitigate" the false designation by indicating that the concern is not a life safety issue. An unmitigated false statement indicates a seismic deficiency.

A conforming building is defined as a building originally constructed in compliance with the requirements of the 1973 of the California Building Code (CBC) or later edition. Conforming buildings that satisfy all applicable criteria will be placed in Structural Performance Category (SPC) 5. Other conforming buildings that are determined to have seismic deficiencies are placed in either SPC 4 or SPC 3, as directed by the evaluation statements.

Similarly, non-conforming buildings will be classified as SPC 2 or SPC 1. Generally, a false answer to any evaluation statement results in a nonconforming building being placed in SPC 1, unless directed otherwise by that particular evaluation statement.

2.4 Structural Evaluation

EQE prepared a Quick Check of the structure in accordance with section 5.1.1 of SB 1953 to determine the average shear stress in the concrete shear walls. The analysis indicated that the average wall stress at the first story was 59 psi, which is greater than the allowable limit of 50 psi. EQE then conducted a more detailed structural evaluation to more accurately analyze the building.

For the detailed structural evaluation, EQE prepared a three-dimensional finite element computer model to capture the building's relevant dynamic characteristics, such as, mass distribution, stiffness and damping mechanism. Figure 2-1 shows the ETABS computer model of the building. The computer model is subjected to the seismic forces obtained from the static procedure specified in the SB 1953 Regulation to evaluate the seismic demand on each structural element. Following this procedure, the total seismic forces for the building was calculated as 3,833 kips.

The building's primary seismic deficiency lies in the lack of reinforcement in the shear walls and diaphragms. The following deficiencies are found and if applicable SB 1953 mitigation techniques are used if applicable:

1. SHEARING STRESS CHECK: The building does not satisfy the Quick Check analysis. Doing a detailed analysis will mitigate this item in accordance with the SB 1953 procedure.

2. CONFINEMENT REINFORCING: The shear wall does not have the required confinement reinforcing for the boundary elements. Increasing the seismic force by 25 percent will mitigate this item in accordance with the SB 1953 procedure.

3. REINFORCING STEEL: The concrete shear walls do not have the minimum required reinforcement. Increasing the seismic force by 25 percent will mitigate this item in accordance with the SB 1953 procedure.

4. PLAN IRREGULARITIES: The openings in concrete diaphragm at the courtyard do not have the required steel reinforcement at the re-entrant corners. This item could not be mitigated based on the SB 1953 procedure.

5. GEOLOGIC SITE HAZARDS: Liquefaction, slope failure and surface fault rupture hazards may be mitigated pending a geotechnical investigation.

The ETABS model identified numerous walls that do not meet the requirements of the SB 1953 procedure with the revised seismic loads per Items 2 and 3 above. Further, Item 4 above cannot be mitigated without additional work to the building. The building is therefore categorized as **SPC 1**.

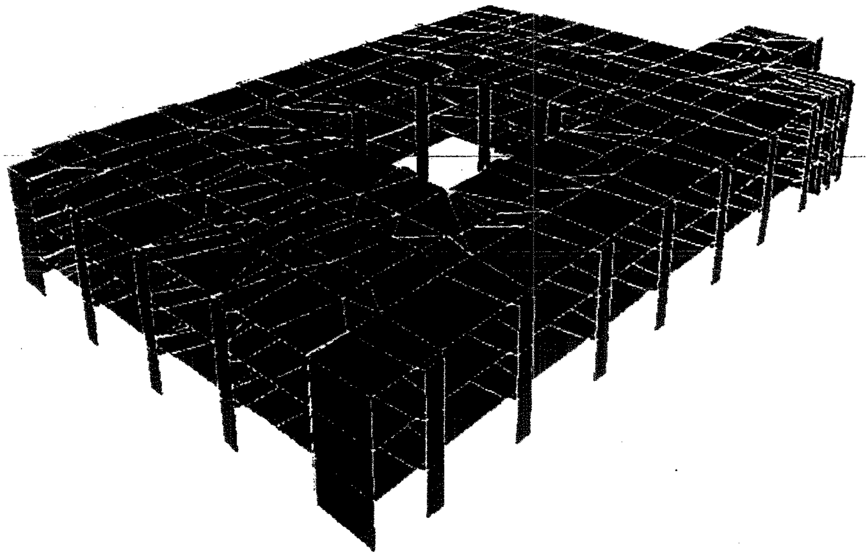

Figure 2-1: ETABS Model of the building

2.5 Findings

The following recommendations are suggested to address the identified deficiency with the buildings:

1. Material testing is required to verify the existing strength of shear walls.
2. A seismic hazards evaluation is required to address the site specific geotechnical hazards associated with the site.

3. References

1. Senate Bill 1953, "Hospital Seismic Upgrade Program," 1994.

2. SB1953, "Seismic Evaluation and Retrofit Regulation," May 1998.

3. Original Structural Drawing dated 1967

   Architect: William E. Short

   Structural Engineer: Robert E. Jones

Appendix A - SB 1953 Background, Structural Categories

A.1 SB 1953 Background

Major structural damage to hospitals in the Northridge Earthquake (January 17, 1994) occurred in buildings constructed before the 1973 Alfred E. Alquist Hospital Facilities Seismic Safety Act, while hospitals constructed in accordance with the Act faired much better and suffered little damage. Both pre and post Act hospitals suffered damage to architectural systems and to power and water systems that prevented continued operation of the facilities after the earthquake.

The OSHPD earthquake survivability surveys completed in 1989 indicated that more than 83% of California's hospital beds were in buildings constructed prior to 1973 and 26% of the beds were in buildings posing significant risk of collapse. The surveys also concluded that nine of the 490 hospitals surveyed are in Alquist-Priolo Earthquake Fault Rupture Zones, 31 are in areas subject to soil liquefaction, and 14 are in areas with landslide potential.

By enacting SB 1953, the State of California took steps to disclose the expected earthquake performance of hospital buildings to the public, require retrofit or replacement of buildings that are at risk of collapse during an earthquake. They also require seismic upgrade of equipment and nonstructural systems to improve the ability of hospitals to remain operational.

As mandated by SB 1953, OSHPD developed definitions of earthquake performance categories for acute care hospital buildings, regulations to identify the most critical equipment and nonstructural systems, and time frames for upgrading those systems with the greatest risk of failure during an earthquake. The Bill also requires OSHPD to develop procedures for the seismic evaluation and analysis of existing acute care hospital facilities. SB 1953 further requires that OSHPD submit specific portions of this information to CBSC by June 30 and requires that CBSC review, revise as necessary, and adopt the information by December 31, 1996, and June 30, 1997, respectively.

Under Article 9 of SB 1953, hospital owners are required to conduct a seismic evaluation of their acute care facilities, which must be submitted to OSHPD for review and approval, within three years after the adoption of the standards by the CBSC, or by about January 1, 2000. OSHPD indicates that this requirement will apply to all facility buildings that house acute care activities, as specified on the hospital's license, which would also include such supporting functions as accounting and administration associated with providing acute care services. Following the initial seismic evaluation, nonconforming buildings would be required to be removed from acute care service or brought into compliance by the year 2008 or 2030, depending on the Structural Performance Category (SPC). OSHPD has established a preliminary time frame for upgrading nonconforming equipment and nonstructural systems. It appears that upgrades for equipment and nonstructural items will be required well before the 2008 deadline required for nonconforming buildings (see time frames in A.3).

A.2 Structural Performance Categories

The current OSHPD definitions of seismic performance categories and the associated usage restrictions are summarized as follows:

Structural Performance Categories	
SPC Category	**Description**
SPC 5	Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, and reasonably capable of providing services to the public following strong ground motion. Buildings in this category will have been constructed or reconstructed under a building permit obtained through OSHPD. These buildings may be used without restriction to January 1, 2030, and beyond.
SPC 4	Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, but may experience structural damage which may inhibit ability to provide services to the public following strong ground motion. Buildings in this category will have been constructed or reconstructed under a building permit obtained through OSHPD. These buildings may be used to January 1, 2030, and beyond.

Structural Performance Categories	
SPC Category	**Description**
SPC 3	Buildings in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, utilizing steel moment resisting frames in regions of high seismicity as defined in Section 4.2.10 and constructed under a permit issued prior to October 25, 1994. These buildings may experience structural damage which does not significantly jeopardize life, but may not be repairable or functional following strong ground motion. Buildings in this category will have been constructed or reconstructed under a building permit obtained through OSHPD.
SPC 2	Buildings in compliance with the pre-1973 California Building Standards Code, or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act. These buildings do not significantly jeopardize life, but may not be repairable or functional following strong ground motion. These buildings must be brought into compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, its regulations, or its retrofit provisions by January 1, 2030, or be removed from acute care service.
SPC 1	Buildings posing a significant risk of collapse and a danger to the public. These buildings must be brought up to the SPC 2 level by January 1, 2008, or be removed from acute care service.

The following summarizes some of the critical building deficiencies that would result in a conforming building being placed in SPC 4, or a nonconforming building being placed in SPC 1:

- <u>Weak Story</u>: The story strength at any story is less than 80% of the strength of the story above
- <u>Vertical Discontinuity</u>: Shear walls, infilled walls, and frames are not continuous to the foundation
- <u>Torsion</u>: The difference between the center of rigidity and center of mass exceeds 20% of the building width
- <u>Adjacent Buildings</u>: The floors of adjacent buildings do not line up at the same elevation or where the smaller building is less than half the height of the taller building

- Short "Captive" Columns: Columns have height-to-depth ratios less than 75% of the ratios for that level

- Pre-Northridge Welded Moment Frame Joints in Seismic Zone 4: Connections are susceptible to the type of damage that occurred in Northridge

- Stucco, Plaster, or Gypsum Wallboard Shear Walls: Systems do not have the strength to act as the primary lateral-force-resisting system

- Connection and Column Splice Strength for Steel Braced Frames: Unable to develop yield capacity of frame members

- Concrete Braced Frames: Unable to provide required ductility

- Inadequate Stiffness of Wall Anchors: Not stiff enough to prevent movement between the wall and roof

- Inadequate Interconnection of Elements: Girders do not have special ties to secure anchor bolts, girders bear on corbels with less than 3 inches bearing width, or corbel has welded elements

- Unreinforced masonry buildings: Unreinforced masonry buildings are placed in SPC 1

APPENDIX A

SB 1953 BACKGROUND, STRUCTURAL CATEGORIES

Appendix A - SB 1953 Background, Structural Categories

A.1 SB 1953 Background

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The current OSHPD definitions of seismic performance categories and the associated usage restrictions are summarized as follows:

Structural Performance Categories	
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Structural Performance Categories	
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SPC 2	Buildings in compliance with the pre-1973 California Building Standards Code, or other applicable standards, but not in compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act. These buildings do not significantly jeopardize life, but may not be repairable or functional following strong ground motion. These buildings must be brought into compliance with the structural provisions of the Alquist Hospital Facilities Seismic Safety Act, its regulations, or its retrofit provisions by January 1, 2030, or be removed from acute care service.
SPC 1	Buildings posing a significant risk of collapse and a danger to the public. These buildings must be brought up to the SPC 2 level by January 1, 2008, or be removed from acute care service.

The following summarizes some of the critical building deficiencies that would result in a conforming building being placed in SPC 4, or a nonconforming building being placed in SPC 1:

- Weak Story: The story strength at any story is less than 80% of the strength of the story above
- Vertical Discontinuity: Shear walls, infilled walls, and frames are not continuous to the foundation
- Torsion: The difference between the center of rigidity and center of mass exceeds 20% of the building width
- Adjacent Buildings: The floors of adjacent buildings do not line up at the same elevation or where the smaller building is less than half the height of the taller building

- Short "Captive" Columns: Columns have height-to-depth ratios less than 75% of the ratios for that level

- Pre-Northridge Welded Moment Frame Joints in Seismic Zone 4: Connections are susceptible to the type of damage that occurred in Northridge

- Stucco, Plaster, or Gypsum Wallboard Shear Walls: Systems do not have the strength to act as the primary lateral-force-resisting system

- Connection and Column Splice Strength for Steel Braced Frames: Unable to develop yield capacity of frame members

- Concrete Braced Frames: Unable to provide required ductility

- Inadequate Stiffness of Wall Anchors: Not stiff enough to prevent movement between the wall and roof

- Inadequate Interconnection of Elements: Girders do not have special ties to secure anchor bolts, girders bear on corbels with less than 3 inches bearing width, or corbel has welded elements

- Unreinforced masonry buildings: Unreinforced masonry buildings are placed in SPC 1

APPENDIX B

COMPLETED SB 1953 EVALUATION STATEMENTS

APPENDIX

GENERAL SETS OF EVALUATION STATEMENTS

EVALUATION STATEMENTS FOR THE BASIC BUILDING SYSTEM

Address the following evaluation statements, marking each either true (T) or false (F). Statements that are found to be true identify issues that are acceptable according to the criteria of these regulations; statements that are found to be false identify issues that need investigation. For guidance in the investigation, refer to the regulation section indicated in parentheses at the end of the statement.

BUILDING SYSTEM

T F LOAD PATH: The structure contains a complete load path for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation. (Section 3.1)

T F REDUNDANCY: The structure will remain laterally stable after the failure of any single element. (Section 3.2)

CONFIGURATION

T F N/A WEAK STORY: Visual observation or a Quick Check indicates that there are no significant strength discontinuities in any of the vertical elements in the lateral-force-resisting system; the story strength at any story is not less than 80 percent of the strength of the story above. (Section 3.3.1)

T F N/A SOFT STORY: Visual observation or a Quick Check indicates that there are no significant stiffness discontinuities in any of the vertical elements in the lateral-force-resisting system; the lateral stiffness of a story is not less than 70 percent of that in the story above or less than 80 percent of the average stiffness of the three stories above. (Section 3.3.2)

T F N/A GEOMETRY: There are no significant geometrical irregularities; there are no setbacks (i.e., no changes in horizontal dimension of the lateral-force-resisting system of more than 30 percent in a story relative to the adjacent stories). (Section 3.3.3)

T F N/A MASS: There are no significant mass irregularities; there is no change of effective mass of more than 50 percent from one story to the next, excluding light roofs. (Section 3.3.4)

T F N/A VERTICAL DISCONTINUITIES: All shear walls, infilled walls, and frames are continuous to the foundation. (Section 3.3.5)

T F TORSION: The lateral force resisting elements form a well balanced system that is not subject to significant torsion. Significant torsion will be taken as any condition where the distance between the story center of rigidity and the story center of mass is greater than 20 percent of the width of the structure in either major plan dimension. (Section 3.3.6)

ADJACENT BUILDINGS

T F ADJACENT BUILDINGS: There is no immediately adjacent structure that is less than half as tall or has floors/levels that do not match those of the building being evaluated. A neighboring structure is considered to be "immediately adjacent" if it is within 2 inches times the number of stories away from the building being evaluated. (Section 3.4)

DEFLECTION INCOMPATIBILITY

T F DEFLECTION INCOMPATIBILITY: Column and Beam Assemblies that are not part of the lateral force-resisting system (i.e., gravity load-resisting frames) are capable of accommodating imposed building drifts, including amplified drift caused by diaphragm deflections, without loss of vertical load carrying capacity. (Section 3.5)

SHORT "CAPTIVE" COLUMNS

T F SHORT "CAPTIVE COLUMNS: There are no columns with height-to-depth ratios less than 75% of the nominal height-to-depth ratios of the typical columns at that level. (Section 3.6)

MATERIALS AND CONDITIONS

T F N/A DETERIORATION OF WOOD: None of the wood members shows signs of decay, shrinkage, splitting, fire damage, or sagging and none of the metal accessories is deteriorated, broken, or loose. (Section 3.7.1)

T F N/A OVERDRIVEN NAILS: There is no evidence of overdriven nails in the shear walls or diaphragms. (Section 3.7.2)

T F N/A DETERIORATION OF STEEL: There is no significant visible rusting, corrosion, or other deterioration in any of the steel elements in the vertical or lateral-force-resisting systems. (Section 3.7.3)

T F N/A DETERIORATION OF CONCRETE: There is no visible deterioration of concrete or reinforcing steel in any of the frame elements. (Section 3.7.4)

T F N/A POST-TENSIONING ANCHORS: There is no evidence of corrosion or spalling in the vicinity of post-tensioning or end fittings. Coil anchors have not been used. (Section 3.7.5)

T F N/A CONCRETE WALL CRACKS: All diagonal cracks in the wall elements are 1.0 mm or less in width, are in isolated locations, and do not form an X pattern. (Section 3.7.6)

T F N/A CRACKS IN BOUNDARY COLUMNS: There are no diagonal cracks wider than 1.0mm in concrete columns that encase the masonry infills. (Section 3.7.7)

T F N/A PRECAST CONCRETE WALLS: There is no significant visible deterioration of concrete or reinforcing steel or evidence of distress, especially at the connections. (Section 3.7.8)

T F N/A MASONRY JOINTS: The mortar cannot be easily scraped away from the joints by hand with a metal tool, and there are no significant areas of eroded mortar. (Section 3.7.9)

T F N/A MASONRY UNITS: There is no visible deterioration of large areas of masonry units. (Section 3.7.10)

T F N/A CRACKS IN INFILL WALLS: There are no diagonal cracks in the infilled walls that extend throughout a panel or are greater than 1.0 mm wide. (Section 3.7.11)

EVALUATION STATEMENTS FOR VERTICAL SYSTEMS RESISTING LATERAL FORCES

Address the following evaluation statements, marking each either true (T) or false (F). Statements that are found to be true identify issues that are acceptable according to the criteria of these regulations; statements that are found to be false identify issues that need investigation. For guidance in the investigation, refer to the section indicated in parentheses at the end of the statement.

MOMENT FRAMES

Frames with Infill Walls

T F N/A INTERFERING WALLS: All infill walls placed in the moment frames are isolated from the structural elements. (Section 4.1.1)

Steel Moment Frames

T F N/A DRIFT CHECK: The building satisfies the Quick Check of the frame drift. (Section 4.2.1)

T F N/A COMPACT MEMBERS: All moment frame elements meet the compact section requirements of the basic AISC documents. (Section 4.2.2)

T F N/A BEAM PENETRATIONS: All openings in frame-beam webs have a depth less than 1/4 of the beam depth and are located in the center half of the frame beams. (Section 4.2.3)

T F N/A MOMENT CONNECTIONS: All beam-column connections in the lateral force resisting moment frame have full-penetration flange welds and a bolted or welded web connection. (Section 4.2.4)

T F N/A COLUMN SPLICES: All column splice details of the moment resisting frames include connection of both flanges and the web. (Section 4.2.5)

T F N/A JOINT WEBS: All web thicknesses within joints of moment resisting frames meet the AISC criteria for web shear. (Section 4.2.6)

T F N/A GIRDER FLANGE CONTINUITY PLATES: There are girder flange continuity plates at joints. (Section 4.2.7)

T F N/A STRONG COLUMN/WEAK BEAM: At least one half of the joints are strong column/weak beam (33 percent on every line of moment frame). Roof joints need not be considered. (Section 4.2.8)

T F N/A OUT-OF-PLANE BRACING: Beam-column joints are braced out-of-plane. (Section 4.2.9)

T F N/A PRE-NORTHRIDGE EARTHQUAKE WELDED MOMENT FRAME JOINTS: Welded steel moment frame beam-column joints are designed and constructed in accordance with recommendations in FEMA 267, Interim Guidelines: Evaluation, Repair, Modification, and Design of Welded Steel Moment Frame Structures, August 1995. (Section 4.2.10)

Concrete Moment Frames

T F N/A SHEARING STRESS CHECK: The building satisfies the Quick Check of the average shearing stress in the columns. (Section 4.3.1)

T F N/A DRIFT CHECK: The building satisfies the Quick Check of story drift. (Section 4.3.2)

T F N/A PRESTRESSED FRAME ELEMENTS: The lateral-load-resisting frames do not include any prestressed or post-tensioned elements. (Section 4.3.3)

T F N/A JOINT ECCENTRICITY: There are no eccentricities larger than 20 percent of the smallest column plan dimension between girder and column centerlines. (Section 4.3.4)

T F N/A NO SHEAR FAILURES: The shear capacity of frame members is greater than the moment capacity. (Section 4.3.5)

T F N/A STRONG COLUMN/WEAK BEAM: The moment capacity of the columns appears to be greater than that of the beams. (Section 4.3.6)

T F N/A STIRRUP AND TIE HOOKS: The beam stirrups and column ties are anchored into the member cores with hooks of 135 degrees or more. (Section 4.3.7)

T F N/A COLUMN-TIE SPACING: Frame columns have ties spaced at $d/4$ or less throughout their length and at 8 d_b or less at all potential plastic hinge regions. (Section 4.3.8)

T F N/A COLUMN-BAR SPLICES: All column bar lap splice lengths are greater than 35 d_b long and are enclosed by ties spaced at 8 d_b or less. (Section 4.3.9)

T F N/A BEAM BARS: At least two longitudinal top and two longitudinal bottom bars extend continuously throughout the length of each frame beam. At least 25 percent of the steel provided at the joints for either positive or negative moment is continuous throughout the members. (Section 4.3.10)

T F N/A BEAM-BAR SPLICES: The lap splices for the longitudinal beam reinforcing are located within the center half of the member lengths or in the vicinity of potential plastic hinges. (Section 4.3.11)

T F N/A STIRRUP SPACING: All beams have stirrups spaced at $d/2$ or less throughout their length and at 8 d_b or less at potential hinge locations. (Section 4.3.12)

T F N/A BEAM TRUSS BARS: Bent-up longitudinal steel is not used for shear reinforcement. (Section 4.3.13)

T F N/A JOINT REINFORCING: Column ties extend at their typical spacing through all beam-column joints at exterior columns. (Section 4.3.14)

T F N/A FLAT SLAB FRAMES: The system is not a frame consisting of a flat slab/plate without beams. (Section 4.3.15)

Precast Concrete Moment Frames

T F N/A PRECAST FRAMES: The lateral loads are not resisted by precast concrete frame elements. (Section 4.4.1)

T F N/A PRECAST CONNECTIONS: For buildings with concrete shear walls, the connection between precast frame elements such as chords, ties, and collectors in the lateral-force-resisting system can develop the capacity of the connected members. (Section 4.4.2)

Frames Not Part of the Lateral-Force-Resisting System

T F N/A COMPLETE FRAMES: The steel or concrete frames form a complete vertical load carrying system. (Section 4.5.1)

SHEAR WALLS

Concrete Shear Walls

T F N/A SHEARING STRESS CHECK: The building satisfies the Quick Check of the shearing stress in the shear walls. (Section 5.1.1)

T F N/A OVERTURNING: All shear walls have h_w/L_w ratios less than 4 to 1. (Section 5.1.2)

T F N/A COUPLING BEAMS: The stirrups in all coupling beams are spaced at $d/2$ or less and are anchored into the core with hooks of 135 degrees or more. (Section 5.1.3)

T F N/A COLUMN SPLICES: Steel column splice details in shear wall boundary elements can develop the tensile strength of the column. (Section 5.1.4)

T F N/A WALL CONNECTIONS: There is positive connection between the shear walls and the steel beams and columns. (Section 5.1.5)

T F N/A CONFINEMENT REINFORCING: For shear walls with h_w/L_w greater than 2.0, the boundary elements are confined with spirals or ties with spacing less then $8\,d_b$. (Section 5.1.6)

T F N/A REINFORCING STEEL: The area of reinforcing steel for concrete walls is greater than 0.0025 times the gross area of the wall along both the longitudinal and transverse axes and the maximum spacing of reinforcing steel is 18 inches. (Section 5.1.7)

T F N/A REINFORCING AT OPENINGS: There is special wall reinforcement around all openings. (Section 5.1.8)

Precast Concrete Shear Walls

T F N/A PANEL-TO-PANEL CONNECTIONS: Adjacent wall panels are not connected by welded steel inserts. (Section 5.2.1)

T F N/A WALL OPENINGS: Openings constitute less than 75 percent of the length of any perimeter wall with the wall piers having h_w/l_w ratios of less than 2.0. (Section 5.2.2)

T F N/A COLLECTORS: Wall elements with openings larger than a typical panel at a building corner are connected to the remainder of the wall with collector reinforcing. (Section 5.2.3)

Reinforced Masonry Shear Walls

T F N/A SHEARING STRESS CHECK: The building satisfies the Quick Check of the shearing stress in the reinforced masonry shear walls. (Section 5.3.1)

T F N/A REINFORCING: The total vertical and horizontal reinforcing steel in reinforced masonry walls is greater than 0.002 times the gross area of the wall with a minimum of 0.0007 in either of the two directions; the spacing of reinforcing steel is less than 48 inches; and all vertical bars extend to the top of the walls. (Section 5.3.2)

T F N/A REINFORCING AT OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides. (Section 5.3.3)

Unreinforced Masonry Shear Walls

T F N/A SHEARING STRESS CHECK: The building satisfies the Quick Check of the shearing stress in the unreinforced masonry shear walls. (Section 5.4.1)

T F N/A MASONRY LAY-UP: Filled collar joints of multiwythe masonry walls have negligible voids. (Section 5.4.2)

Infill Walls in Frames

T F N/A PROPORTIONS: The height/thickness ratio of the wall panels is as follows: (Section 5.5.1)

One-story building	$h_w/t < 14$
Multistory building	
Top story	$h_w/t < 9$
Other stories	$h_w/t < 20$

T F N/A SOLID WALLS: The infill walls are not of cavity construction. (Section 5.5.2)

T F N/A CONTINUOUS WALLS: The infill walls are continuous to the soffits of the frame beams. (Section 5.5.3)

T F N/A WALL CONNECTIONS: All infill panels are constructed to encompass the frames around their entire perimeter. (Section 5.5.4)

Walls in Wood-Frame Buildings

T F N/A SHEARING STRESS CHECK: The building satisfies the Quick Check of the shearing stress in the wood shear walls. (Section 5.6.1)

T F N/A OPENINGS: Walls with garage doors or other large openings are braced with plywood shear walls or are supported by adjacent construction through substantial positive ties. (Section 5.6.2)

T F N/A WALL REQUIREMENTS: All walls supporting tributary area of 24 to 100 square feet per foot of wall are plywood sheathed with proper nailing or rod braced and have a height-to-depth (*H/D*) ratio of 1 to 1 or less or have properly detailed and constructed hold downs. (Section 5.6.3)

T F N/A CRIPPLE WALLS: All exterior cripple walls below the first floor level are braced to the foundation with shear elements. (Section 5.6.4)

T F N/A NARROW SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2 to 1 do not resist forces developed in the building. (Section 5.6.5)

T F N/A STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary lateral-force-resisting system. (Section 5.6.6)

T F N/A PLASTER OR GYPSUM WALLBOARD SHEAR WALLS: Interior plaster or gypsum wallboard is not being used for shear walls in buildings over one story in height. (Section 5.6.4)

BRACED FRAMES

Concentric Braced Frames

T F N/A STRESS CHECK: The building satisfies the Quick Check of the stress in the diagonals. (Section 6.1.1)

T F N/A STIFFNESS OF DIAGONALS: All diagonal elements required to carry compression have *Kl/r* ratios less than 120. (Section 6.1.2)

T F N/A TENSION-ONLY BRACES: Tension-only braces are not used as the primary diagonal bracing elements in structures over two stories in height. (Section 6.1.3)

T F N/A CHEVRON BRACING: The bracing system does not include chevron, V-, or K-braced bays. (Section 6.1.4)

T F N/A CONCENTRIC JOINTS: All the diagonal braces frame into the beam-column joints concentrically. (Section 6.1.5)

T F N/A CONNECTION STRENGTH: All the brace connections are able to develop the yield capacity of the diagonals. (Section 6.1.6)

T F N/A COLUMN SPLICES: All column splice details of the braced frames can develop the column yield capacity. (Section 6.1.7)

T F N/A CONCRETE BRACED FRAMES: None of the braces in the framing system are of reinforced concrete construction. (Section 6.1.8)

Eccentric Braced Frames

T F N/A LINK BEAM LOCATION: The link beams are not connected to the columns. (Section 6.2.1)

EVALUATION STATEMENTS FOR DIAPHRAGMS

Address the following evaluation statements, marking each either true (T) or false (F). Statements that are found to be true identify issues that are acceptable according to the criteria of these regulations; statements that are found to be false identify issues that need investigation. For guidance in the investigation, refer to the section indicated in parentheses at the end of the statement.

T F N/A PLAN IRREGULARITIES: There is significant tensile capacity at re-entrant corners or other locations of plan irregularities. (Section 7.1.1)

T F N/A CROSS TIES: There are continuous cross ties between diaphragm chords. (Section 7.1.2)

T F N/A REINFORCING AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50 percent of the building width in either major plan dimension. (Section 7.1.3)

T F N/A OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls constitute less than 25 percent of the wall length, and the available length appears sufficient. (Section 7.1.4)

T F N/A OPENINGS AT BRACED FRAMES: Diaphragm openings immediately adjacent to the braced frames extend less than 25 percent of the length of the bracing. (Section 7.1.5)

T F N/A OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry walls are no more than 8 feet long. (Section 7.1.6)

WOOD DIAPHRAGMS

T F N/A SHEATHING: None of the diaphragms consist of straight sheathing or have span/depth ratios greater than 2 to 1. (Section 7.2.1)

T F N/A SPANS: All diaphragms with spans greater than 24 feet have plywood or diagonal sheathing. Structures in building type 2 may have rod-braced systems. (Section 7.2.2)

T F N/A UNBLOCKED DIAPHRAGMS: Unblocked wood panel diaphragms consist of horizontal spans of less than 40 feet and have span/depth ratios less than or equal to 3 to 1. (Section 7.2.3)

T F N/A SPAN DEPTH RATIO: If the span/depth ratios of wood diaphragms are greater than 3 to 1, there are nonstructural walls connected to all diaphragm levels at less than 40-foot spacing. (Section 7.2.4)

T F N/A DIAPHRAGM CONTINUITY: None of the diaphragms are composed of split-level floors or, in wood commercial or industrial buildings, have expansion joints. (Section 7.2.5)

T F N/A CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Section 7.2.6)

METAL DECK DIAPHRAGMS

T F N/A DECK TOPPING: All metal deck roofs have a reinforced concrete topping slab. (Section 7.3.1)

T F N/A UNTOPPED DIAPHRAGMS: Untopped metal deck diaphragms consist of horizontal spans of less than 40 feet and have span/depth ratios less than or equal to 3 to 1. (Section 7.3.2)

PRECAST CONCRETE DIAPHRAGMS

T F N/A TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a reinforced concrete topping slab. (Section 7.4.1)

T F N/A CONTINUITY OF TOPPING SLAB: The topping slab continues uninterrupted through the interior walls and into the exterior walls or is provided with dowels with a total area equal to the topping slab reinforcing. (Section 7.4.2)

HORIZONTAL BRACING

T F N/A HORIZONTAL BRACING. Horizontal bracing forms a complete system of adequate capacity. (Section 7.5.1)

OTHER SYSTEMS

T F N/A OTHER SYSTEMS: The diaphragm systems does not include thin planks, and/or toppings of gypsum. (Section 7.6.1)

EVALUATION STATEMENTS FOR STRUCTURAL CONNECTIONS

Address the following evaluation statements, marking each either true (T) or false (F). Statements that are found to be true identify issues that are acceptable according to the criteria of these regulations; statements that are found to be false identify issues that need investigation. For guidance in the investigation, refer to the section indicated in parentheses at the end of the statement.

ANCHORAGE FOR NORMAL FORCES

T F N/A WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Section 8.2.1)

T F N/A WALL ANCHORAGE: The exterior concrete or masonry walls are anchored to each of the diaphragm levels for out-of-plane loads. (Section 8.2.2)

T F N/A MASONRY WALL ANCHORS: Wall anchorage connections are steel anchors or straps that are developed into the diaphragm. (Section 8.2.3)

T F N/A ANCHOR SPACING: The anchors from the floor and roof systems into exterior masonry walls are spaced at 4 feet or less. (Section 8.2.4)

T F N/A TILT-UP WALLS: Precast bearing walls are connected to the diaphragms for out-of-plane loads; steel anchors or straps are embedded in the walls and developed into the diaphragm. (Section 8.2.5)

T F N/A PANEL-ROOF CONNECTION: There are at least two anchors from each precast wall panel into the diaphragm elements. (Section 8.2.6)

T F N/A INADEQUATE STIFFNESS OF WALL ANCHORS: Anchors of walls to wood structural elements are installed taut and are stiff enough to prevent movement between the wall and roof. (Section 8.2.7)

SHEAR TRANSFER

T F N/A TRANSFER TO SHEAR WALLS: Diaphragms are reinforced and connected for transfer of loads to the shear walls. (Section 8.3.1)

T F N/A TRANSFER TO STEEL FRAMES: The method used to transfer diaphragm shears to the steel frames is approved for use under lateral loads. (Section 8.3.2)

T F N/A TOPPING SLAB TO WALLS AND FRAMES: Reinforced concrete topping slabs that interconnect the precast concrete diaphragm elements are doweled into the shear wall or frame elements. (Section 8.3.3)

VERTICAL COMPONENTS

T F N/A STEEL COLUMNS: The columns in the lateral force resisting frames are substantially anchored to the building foundation. (Section 8.4.1)

T F N/A CONCRETE COLUMNS: All longitudinal column steel is doweled into the foundation. (Section 8.4.2)

T F N/A WOOD POSTS: There is positive connection of wood posts to the foundation and the elements being supported. (Section 8.4.3)

T F N/A WALL REINFORCING: All vertical wall reinforcing is doweled into the foundation. (Section 8.4.4)

T F N/A SHEAR-WALL-BOUNDARY COLUMNS: The shear wall columns are substantially anchored to the building foundation. (Section 8.4.5)

T F N/A WALL PANELS: The wall panels are connected to the foundation and/or ground floor slab with dowels equal to the vertical panel reinforcing. (Section 8.4.6)

T F N/A WOOD SILLS: All wall elements are bolted to the foundation sill at 6-foot spacing or less with proper edge distance for concrete and wood. (Section 8.4.7)

INTERCONNECTION OF ELEMENTS

T F N/A GIRDERS: Girders are supported by walls or pilasters have special ties to secure the anchor bolts. (Section 8.5.1)

T F N/A CORBEL BEARING: If the frame girders bear on column corbels, the length of bearing is greater than 3 inches. (Section 8.5.2)

T F N/A CORBEL CONNECTIONS: The frame girders are not supported on corbels with welded elements. (Section 8.5.3)

ROOF DECKING

T F N/A LIGHT-GAGE METAL, PLASTIC, OR CEMENTITIOUS ROOF PANELS: All light-gage metal, plastic, or cementitious roof panels are properly connected to the roof framing at not more than 12 inches on center. (Section 8.6.1)

T F N/A WALL PANELS: All wall panels (metal, fiberglass, or cementitious) are properly connected to the wall framing. (Section 8.6.2)

EVALUATION STATEMENTS FOR FOUNDATIONS AND GEOLOGIC SITE HAZARDS

Address the following evaluation statements, marking each either true (T) or false (F). Statements that are found to be true identify issues that are acceptable according to the criteria of these regulations; statements that are found to be false identify issues that need investigation. For guidance in the investigations, refer to the section indicated in parentheses at the end of the statement.

CONDITION OF FOUNDATIONS

T F FOUNDATION PERFORMANCE: The structure does not show evidence of excessive foundation movement such as settlement or heave that would affect its integrity or strength. (Section 9.1.1)

T F DETERIORATION: There is no evidence that foundation elements have deteriorated due to corrosion, sulphate attack, material breakdown, or other reasons in a manner that would affect the integrity or strength of the structure. (Section 9.1.2)

CAPACITY OF FOUNDATIONS

T F OVERTURNING: The ratio of the effective horizontal dimension, at the foundation level of the seismic resisting system, to the building height (base/height) exceeds 1.4A_v. (Section 9.2.1)

T F TIES BETWEEN FOUNDATION ELEMENTS: Foundation ties adequate for seismic forces exist where footings, piles, and piers are not restrained by beams, slabs, or competent soils or rock. (Section 9.2.2)

T F N/A LOAD PATH AT PILE CAPS: The pile caps are capable of transferring overturning and lateral forces between the structure and individual piles in the pile cap. (Section 9.2.3)

T F N/A LATERAL FORCE ON DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Section 9.2.4)

T F N/A POLE BUILDINGS: Pole foundations have adequate embedment. (Section 9.2.5)

T F SLOPING SITES: The grade difference from one side of the building to another does not exceed one-half story. (Section 9.2.6)

GEOLOGIC SITE HAZARDS

T F* N/A LIQUEFACTION: Liquefaction susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 feet under the building. (Section 9.3.1)

* PENDING SOILS REPORT

T F *

SLOPE FAILURE: The building site is sufficiently remote from potential earthquake-induced slope failures or rockfalls to be unaffected by such failures or is capable of accommodating small predicted movements without failure. (Section 9.3.2)

T F *

SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site is not anticipated. (Section 9.3.3)

EVALUATION STATEMENTS FOR ELEMENTS THAT ARE NOT PART OF THE LATERAL FORCE RESISTING SYSTEM

Address the following evaluation statements, marking each either true (T) or false (F). Statements that are found to be true identify issues that are acceptable according to the criteria of these regulations; statements that are found to be false identify issues that need investigation. For guidance in the investigation, refer to the section indicated in parentheses after the headings.

NON STRUCTURAL WALLS

Partitions

T F N/A MASONRY PARTITIONS: There are no unbraced unreinforced masonry or hollow clay tile partitions in critical care areas, clinical laboratory service spaces, pharmaceutical service spaces, radiological service spaces, and central and sterile supply areas, exit corridors, elevator shafts, or stairwells. (Sec. 10.1.1.1)

T F N/A STRUCTURAL SEPARATIONS: At structural separations, partitions in exit corridors have seismic or control joints. (Sec 10.1.1.2)

T F N/A PARTITION BRACING: In exit corridors, the tops of partitions that only extend to the ceiling line have lateral bracing. (Section 10.1.1.3)

Cladding and Veneer

T F N/A MASONRY VENEER: Masonry veneer is connected to the back-up with corrosion-resistant ties spaced 24 inches on center maximum with at least one tie for every 2-2.3 square feet. (Section 10.1.2.1)

T F N/A CLADDING PANELS IN MOMENT FRAME BUILDINGS: For moment frame buildings of steel or concrete, panels are isolated from the structural frame to absorb predicted inter-story drift without collapse. (Section 10.1.2.2)

T F N/A CLADDING PANEL CONNECTIONS: Where bearing connections are required, there are at least two bearing connections for each cladding panel, and there are at least four connections for each cladding panel capable of resisting out-of-plane forces. (Section 10.1.2.3)

T F N/A CLADDING PANEL CONDITION: Cladding panel connections appear to be installed properly. No connection element is severely deteriorated or corroded. There is no cracking in the panel materials indicative of substantial structural distress. There is no substantial damage to exterior cladding due to water leakage. There is no substantial damage to exterior wall cladding due to temperature movements. (Section 10.1.2.4)

Metal Stud Back-up Systems

T F N/A METAL STUD BACK-UP SYSTEMS, GENERAL: Additional steel studs frame window and door openings. Corrosion of veneer ties, tie screws, studs, and stud tracks is minimal. Stud tracks are adequately fastened to the structural frame. (Section 10.1.3.1)

T F N/A MASONRY VENEER WITH STUD BACK-UP: Masonry veneer more than 30 feet above the ground is supported by shelf angles or other elements at each floor level. Masonry veneer is adequately anchored to the back-up at locations of through-wall flashing. Masonry veneer is connected to the back-up with corrosion-resistant ties spaced 24 inches on center maximum and with at least one tie for every 2-2/3 square feet. (Section 10.1.3.2)

Masonry Veneer with Concrete Block Back-up

T F N/A MASONRY VENEER WITH CONCRETE BLOCK BACK-UP, GENERAL: The concrete block back-up qualifies as reinforced masonry. (Section 10.1.4.1)

T F N/A MASONRY VENEER SUPPORT: Masonry veneer more than 30 feet above the ground is supported by shelf angles or other elements at each floor level. Masonry veneer is adequately anchored to the back-up at locations of through-wall flashing. Masonry veneer is connected to the back-up with corrosion-resistant ties spaced 24 inches on center maximum and with at least one tie for every 2-2/3 square feet. The concrete block back-up is positively anchored to the structural frame at 4 feet maximum intervals along the floors and roofs. (Section 10.1.4.2)

Other Veneer/panel Systems

T F N/A THIN STONE VENEER PANELS: Stone anchorages are adequate for computed loads. (Section 10.1.5.1)

T F N/A WOOD/AGGREGATE PANELS: There is no visible deterioration of screws or wood at panel attachment points. (Section 10.1.5.2)

Parapets, Cornices, Ornamentation, and Appendages

T F N/A PARAPETS, CORNICES, ORNAMENTATION, AND APPENDAGES: There are no laterally unsupported unreinforced masonry parapets or cornices above the highest anchorage level with height/thickness ratios greater than 1.5. Concrete parapets with height/thickness ratios greater than 1.5 have vertical reinforcement. Cornices, parapets, signs, and other appendages that extend above the highest anchorage level or cantilever from exterior wall faces and other exterior wall ornamentation are reinforced and well anchored to the structural system. (Section 10.1.6)

T F N/A MEANS OF EGRESS: Canopies are anchored and braced to prevent collapse and blockage of building exits. (Section 10.1.7)

APPENDIX C

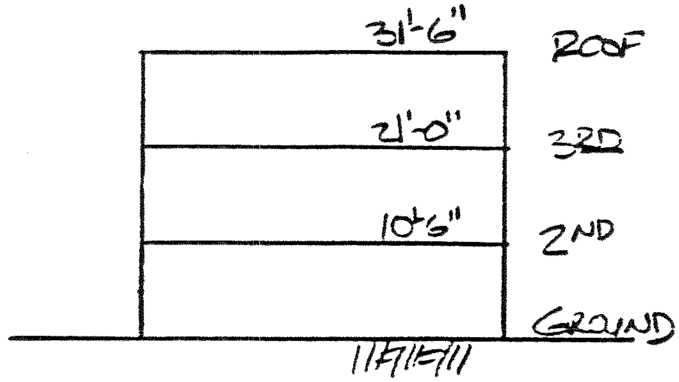
EVALUATION CALCULATIONS

EQE INTERNATIONAL

SHEET NO. 1

JOB NO. ______ JOB SJMC BY LSM DATE 3/01

CALC. NO. ______ SUBJECT QUICK CHECK CHK'D ______ DATE ______



EQE INTERNATIONAL

JOB NO. ______ JOB SJMC

SHEET NO. 2

CALC. NO. ______ SUBJECT SLAB WEIGHT CALCS

BY LSM DATE -'3

CHK'D ______ DATE ______

<u>ROOF SLAB</u> 7" THICK

$$AREA = 202.17'(132.33') - 2.75(17.42) - 5.42(9.17) - 64.67(54.5) + 6'(2')(25) + 27'(40.5') + 6'(27')$$

$$A_{ROOF} = 24{,}690\,ft^2 (7/12)(150) = 2160^k = W$$

$$A_{STAIR} = 18.5(19.5) = 361\,ft^2 \left(\tfrac{4.5}{12}\right)(150) = 21^k$$

$$A_{PENTHOUSE} = 16.5'(19') = 314\,ft^2 \left(\tfrac{4.5}{12}\right)(150) = 17^k$$

25,365

2198^k

<u>THIRD FLOOR</u> 7" THICK

$$A_{MAIN} = [24690 - 39.5(20)] = 22{,}900 \left(\tfrac{7}{12}\right)(150) = 2004^k$$

$$A_2 = 39.5(20)\left(3/12\right)(150) = 79^k$$

2133^k

<u>SECOND FLOOR</u> THICKNESS 11.25"(?)

$$A_{MAIN} = 24{,}690 - 20'(39.5) = 22{,}900\,ft^2 \left(\tfrac{7}{12}\right)(150) = 2004^k$$

$$A_2 = 39.5'(20+20) + 20.5'(27.5') = 4144\,ft^2 \left(\tfrac{8}{12}\right)(150) = 415^k$$

$$A_3 = 6'(20) + 31'(14) = 1054\,ft^2\ (10\ PSF) = 11^k$$

2430^k

EQE INTERNATIONAL

			SHEET NO. 3
JOB NO.	JOB SJMC	BY LSM	DATE 3/01
CALC. NO.	SUBJECT WALL WEIGHTS	CHK'D	DATE

THIRD FLOOR WALLS N/S (ALL WALL ARE 7" UNO)

ADD ALL COLS IN N/S DIR

GRID 12 NO SHEAR WALLS

$W = 10.5'(207.67)(8/12)(150) =$ 218^K

GRID 11 9', 17'-6", 17'-6", 17'-6", 18-0", 17'-9", 17'-9", 10'-0" = 125'-0" 7

$W = 10.5(207.67)(7/12)(150) =$ 191^K

GRID 10 35'-6" (8"), 20'-9", 13'-4" (8"), 9'-0", 17'-0", 9'-2", 16'-2"   72'-1" 7" 48'-10" 8"

EXT WALL   COLS

$W = 10.5'\left[(91.5')(7/12) + 63'(8/12) + 1.17(1.5)(5)\right]150$
$+ 70'(1')(1.33)(150)$ = 184^K

DROP BM

GRID 9 17'-0" (8")   17'-0" 8"

$W = 10.5\left[1.33'(1.5')(3) + (17' + 9')(8/12) + 58'(7/12)\right](150) =$ 115^K

GRID 8.8 6'-6" (8")   6'-6" 8"

$W = 10.5\left[42'(8/12) + 1.33(1.5)\right](150)$ = 47^K

GRID 7, 6 NO SHEAR WALLS

$W = 10.5(1.33)(1.5)(150)2$ = 6^K

EQE INTERNATIONAL

JOB NO. ______ JOB SJMC SHEET NO. 4

CALC. NO. ______ SUBJECT THIRD FLR (CONT'D) BY LSM DATE 3, CHK'D ______ DATE ______

GRID 5 NO SHEARWALLS

$$W = 10.5\left[1.33(1.5)(5) + 1.5(3')(2) + 68'(7/12)\right]150 = 93^{K}$$

GRID 4 21'-6", 16'-2", 4'-6", 15'-6", 17'-2", 9'-0", 6'-6" 90'-4" 7"

$$W = 10.5\left[155'(7/12) + 1.33(1.5)(9)\right](150) = 171^{K}$$

GRID 3 13'-0", 17'-2", 17'-2", 17'-6", 17'-2", 17'-2" 99'-2" 7"

$$W = 10.5\left[202.17\left(\tfrac{7}{12}\right)\right](150) = 186^{K}$$

GRID 2,1 9'-4" 9'-4" 7"

$$W = 10.5\left[199.42'(8/12)\right]150 = 210^{K}$$

TOTAL N/S WALLS 421^K

E/W WALLS

GRID A 12'-4" (8"), 20'-0" (8")

$W = 10.5\left[134.92'\left(\frac{8}{12}\right)(150)\right] = 142^k$

GRID B 17'-5" (8")

$W = 10.5(17.42)\left(\frac{8}{12}\right)(150) = 18^k$

GRID C 12'-0", 16'-6", 17'-2", 11' = 56'-8"

$W = 10.5\left(57.0'\right)\left(\frac{7}{12}\right)(150) = 30^k$

GRID D 16'-9", 9'-0", 6'-5", 12'-3" 44'-5'

W = SEE GRID C = 30^k

GRID E 9'-0", 7'-2", 9'-0", 24'-2" = 49'-4"

W = SEE GRID C 30^k

GRID F NO SHEARWALLS

DROP BM'S & COLS

W = 1'(1.33')(89')(150) = 18^k

GRID G

W = 10.5[73.25(8/12)(150)] = 77^k

GRID H 19'-6" (8")

W = 10.5'[73.25'(8/12)(150)] = 77^k

GRID J 13'-0", 10'-6", 17'-2", 11'-4" = 52'-0"

W = 10.5 [[illegible].33' ([illegible])(150)] = 72^k

GRID K 6'-0", 9'-0", 11'-6", 7'-0", 9'-6", 9'-0" = 52'-0"

W = [10.5 (76)(7/12) - 25(1)(1.5)] (150) = 73^k

GRID L 34'9"

W = SEE GRID K = 73^k

EQE INTERNATIONAL

SHEET NO. 7

JOB NO. ______ JOB SJMC BY LSM DATE 3/01

CALC. NO. ______ SUBJECT THIRD FLOOR (CONT'D) CHK'D ______ DATE ______

GRID M 12'-0"

$W = \left[10.5(12')\left(\frac{7}{12}\right) + 1(1.5)(77)\right](150) = 28^K$

GRID N, P 17'-5" (8"), 17'-3" (8"), 19'-9" (8"), 4'-10" (8") = 59'-3"

$W = \left[10.5\left(17.42 + 12 + 19.75(2)\right)\left(\frac{8}{12}\right) + 85'(1')(1.5)\right](150) = 92^K$

GRID Q 23'-0" (8")

$W = 10.5(23)\left(\frac{8}{12}\right)(150) = 29^K$

GRID R 17'-0" 12'-0" 29'-10"

$W = \left(10.5(17+13)\left(\frac{8}{12}\right) + 9(1)(1.5)\right)150 = 34^K$

GRID S

$W = 10.5(27)\left(\frac{8}{12}\right)(150) = 28^K$

TOTAL E/W WALLS 1011 ^{K}

EQE INTERNATIONAL

			SHEET NO. 8
JOB NO.	JOB SJMC	BY LSM	DATE 3/4
CALC. NO.	SUBJECT SECOND FLR & GROUND FLOOR	CHK'D	DATE

SECOND FLR SAME AS THIRD FLOOR

$W_{EW} = 1011^k$

$W_{NS} = 1421^k$

GROUND FLOOR WALLS

SAME WEIGHT AS SECOND & THIRD FLRS, UNO

N/S WALLS

GRID 12 $= 218^k$

GRID 11 $= 191^k$

GRID 10 48'-0" (8"), 20'-9", 13'-0" (8"), 9'-0", 17'-0", 9'-0", 5'-0", 4'-0"   61' 8"; 41.5' 7"

$W = 10.5\left[101'\left(\frac{7}{12}\right) + 61'\left(\frac{8}{12}\right)\right](150) = 157^k$

GRID 9 $= 115^k$

GRID 8, 8.1 $= 47^k$

GRID 7, 6 $= 6^k$

GRID 5 $= 73^k$

GRID 4

$W = 0.5\left[20'\left(\frac{8}{12}\right)(150)\right] + 171^k = 172^k$

GRID 3 = 186^k

GRID 2, 1 = 210^k

TOTAL N/S WALLS = 1415^k

E/W WALLS

GRID A		= 142^k	
GRID B		= 18^k	
GRID C	12'-6", 17'-2", 10'-6", 10'-0"	= 80^k	50.17
GRID D	10'-4", 8'-9", 7'-0", 12'-6"	= 80^k	38.58
GRID E	9'-6", 11'-0", 5'-6", 13'-0", 7'-9"	= 80^k	47.75
GRID F		= 80^k	
GRID G		= 77^k	
GRID H		= 77^k	
GRID J	26'-6", 17'-0", 11'-4"	= 32^k	54'-10"
GRID K		= 73^k	
GRID L	6'-3", 11'-2", 5'-6", 9'-0", 17'-2"	= 73^k	49.07

EQE INTERNATIONAL

				SHEET NO.	10
JOB NO.		JOB	SJMC	BY LSM	DATE 3/..
CALC. NO.		SUBJECT	GROUND FLOOR (CONT'D)	CHK'D	DATE

GRID M = 28^k

GRID N,P 12'-4" (8"), 17'-5" (8"), 26'-4" (8") = 92^k 69'-3

GRID Q = 29^k

GRID R 9'-2", 7'-9", 23'-10", 9'-0", 17'-3", 13'-0" 30'

$W = 10.5\left[(93' + 13')\left(\frac{8}{12}\right)(150)\right]$ = 111^k

GRID S = 28^k

TOTAL E/W 1473^k

EQE INTERNATIONAL

JOB NO. ______ JOB SJMC BY CSM DATE 3/01 SHEET NO. 11

CALC. NO. ______ SUBJECT ______ CHK'D ______ DATE ______

WALL WEIGHT REDUCTION FOR OPENINGS

THIRD FLOOR, SECOND FLOOR, GROUND FLOOR

– N/S DIR

GRID 11

$$W = \tfrac{7}{12}(150)(7')\left[9.33' + 9.33' + 9.5' + 9.17' + 10' + 9.67 + 9.33 + 4 + 4\right]$$

$$= 46^k \qquad = \underline{46^k}$$

GRID 10

$$W = \tfrac{7}{12}(150)(7')\left[6 + 10 + 10 + 5.67\right] = \underline{19^k}$$

GRID 4

$$W = \tfrac{7}{12}(150)(7)\left[7 + 6 + 9.5 + 10 + 3 + 6\right] = \underline{25^k}$$

GRID 3

$$W = \tfrac{7}{12}(150)(7)\left[9.67 + 9.5 + 10 + 10 + 9.5 + 10.17 + 9.33\right] = \underline{42^k}$$

$$\underline{\underline{132^k}}$$

– E/W DIR

GRID C

$$W = 7/12(150)(7)\left[9.5 + 9.67 + 9.5\right] = \underline{17^k}$$

GRID D

$$W = \tfrac{7}{12}(150)(7)\left[10+5+3.5\right] \qquad = \underline{11^{k}}$$

GRID E

$$W = \tfrac{7}{12}(150)(7)\left[3.5+7.33+5\right] \qquad = \underline{10^{k}}$$

GRID J

$$W = \tfrac{7}{12}(150)(7)\left[2.83+9.33+10\right] \qquad = \underline{13^{k}}$$

GRID K

$$W = \tfrac{7}{12}(150)(7)\left[3.67+3.67+5+7.25+3.17\right] \qquad = \underline{14^{k}}$$

GRID L

$$W = \tfrac{7}{12}(150)(7)\left[4.75+10.7\right] \qquad = \underline{9^{k}}$$

$$\underline{\underline{74^{k}}}$$

EQE INTERNATIONAL

				SHEET NO.	13
JOB NO.		JOB	SJMC	BY CSM	DATE 3/01
CALC. NO.		SUBJECT	TOTAL BLDG WEIGHTS	CHK'D	DATE

PARTITIONS = 10 PSF

MECH/MISC = 5 PSF

ROOF LEVEL

$$W = \overset{\text{SLAB}}{2198} + \tfrac{1}{2}\big(\overset{\text{WALLS}}{1421 + 1011}\big) + \overset{\text{MISC}}{25{,}365}\,(5\text{PSF})$$

$= \underline{3541^{k}}$

THIRD FLOOR

$$W = 2160^{k} + 1421 + 1011 + 24690\,(10+5) = \underline{4962^{k}}$$

SECOND FLOOR

$$W = 2133 + \tfrac{1}{2}(1421 + 1011 + 1415 + 1473) + 24{,}\text{[illegible]}(5)$$

$= \underline{5213^{k}}$

EQE INTERNATIONAL

SHEET NO. 14

JOB NO. ______ JOB ______ BY ______ DATE ______

CALC. NO. ______ SUBJECT ______ CHK'D ______ DATE ______

REVISED DIAPHRAGM WEIGHTS

ROOF = $3541 - (132^{k} + 74^{k})\frac{1}{2} = 3348^{k}$

THIRD = $4962 - 132 - 74 = 4756^{k}$

SECOND = $5213 - 132 - 74 = 5007^{k}$

THIRD FLOOR

$$N/S = \frac{7}{12}(125 + 72.08 + 90.33 + 99.17 + 9.33) + \frac{8}{12}(48.83 + 17 + 16.5) = 285.8\ ft^2$$

$$E/W \quad \frac{7}{12}(56.67 + 44.5 + 49.33 + 52 + 52 + 34.75 + 12) + \frac{8}{12}(32.33 + 17.42 + 19.5 + 59.25 + 28) = 280.1\ ft^2$$

SECOND FLOOR

$$N/S = 235.3\ ft^2$$

$$E/W = 261.4\ ft^2$$

GROUND FLOOR

$$N/S = \frac{7}{12}(125 + 64.75 + 90.33 + 99.17 + 9.33) + \frac{8}{12}(61 + [illegible] + [illegible]) = [illegible].7\ ft^2$$

$$E/W = \frac{7}{12}(50.17 + 38.5 + 47.75 + 54.83 + 52 + 49.09 + 12 + 30) + \frac{8}{12}([illegible].42 + 32.33 + [illegible].5 + 6[illegible].25 + 28) = 335.2\ ft^2$$

MODIFICATIONS TO SHEARWALL LENGTHS

THIRD FLOOR, SECOND FLOOR, GROUND FLOOR

— N/S DIRECTION

GRID 12.1 ℓ = 5'-0" (7 TOTAL) A_w = 20.4 ft²

GRID 9.5 ℓ = 5'-0" (2 TOTAL) A_w = 5.8 ft²

— E/W DIRECTION

GRID A ℓ = 5'-0" (TOTAL 3) A_w = 8.7 ft²

GRID 6.7 ℓ = 5'-0" (TOTAL 2) A_w = 5.8 ft²

NEW TOTALS

FLOOR	DIRECTION	AREA
3	N/S	312.0 ft²
3	E/W	284.6 ft²
2	N/S	312.0 ft²
2	E/W	275.9 ft²
1	N/S	315.9 ft²
1	E/W	349.7 ft²

EQE INTERNATIONAL

SHEET NO. 17

JOB NO. ______ JOB SJMC BY LSM DATE 3/01

CALC. NO. ______ SUBJECT FORCE DISTRIBUTION CHK'D ______ DATE ______

VERTICAL DISTRIBUTION OF SEISMIC FORCE

ROOF	1010 ^{K}
3RD FLR	957 ^{K}
2ND FLR	504 ^{K}
TOTAL	2471 ^{K}

SEE ATTACHED SPREADSHEET

SEISMIC FORCE CALCULATION BASED ON SB1953 (STATIC PROCEDURE)

STORY	Weight (kips)	Height (ft)	H (ft)	$W_i{}^*H_i{}^k$ X-Dir.	$W_i{}^*H_i{}^k$ Y-Dir.	F% X-Dir.	F% Y-Dir.	Fx (kips)	Fy (kips)
ROOF	3,348	10.5	31.50	105,462	105,462	40.9%	40.9%	**1010.3**	**1010.3**
3FL	4,756	10.5	21.00	99,876	99,876	38.7%	38.7%	**956.8**	**956.8**
2FL	5,007	10.5	10.50	52,574	52,574	20.4%	20.4%	**503.6**	**503.6**
BASELINE	0	0	0						
TOTALS	13,111	31.5 ft		257,912	257,912	1.0	1.0	2471	2471
above grad	**13,111**	**31.5** ft							

Overturning Moment Mx (ft-k)	Overturning Moment My (ft-k)
0	0
10,608	10,608
31,262	**51,916**

S.F. for Overturning
0.75

Resisting Moment Mx (ft-k)	Resisting Moment My (ft-k)
993,158	648,995
O.K.	**O.K.**

k X-Dir.	k Y-Dir.
1	1

Building Dimension		
Lx=	202	ft
Ly=	132	ft

Building Type
OT
MF: Moment Frame
OT: Other
C_T= 0
Steel Frame: 0.035
Conc. Frame: 0.030

Coeff. (from SB1953)	
Av=	0.4
Aa=	0.4
R=	4.5
S=	1.2
Ca=	1.2
Cd=	4

Base Shear Calculation

T (sec)	Cs (Av)	Cs (Aa)	V / **W**	V (kips)
Tb-X= 0.186	0.2622	0.1884	18.84%	
Ta-X= 0.111	0.3699	0.1884	18.84%	
Tb-Y= 0.226	0.2299	0.1884	18.84%	
Ta-Y= 0.137	0.3210	0.1884	18.84%	
Tused-X= 0.133	0.3275	0.1884	18.84%	**2471**
Tused-Y= 0.165	0.2842	0.1884	18.84%	**2471**

Drift Ratio Check

	Calculated Elastic DR	Actual Elastic DR	Plastic Drift Ratio	Allowable Drift Ratio	
X Dir.	0.00169	0.002	**0.007**	**0.0133**	O.K.
Y-Dir	0.00072	0.001	**0.003**	**0.0133**	O.K.

Level	Force (k)	Base (k)	E/W		N/S	
			A_{WALLS} (ft^2)	Stress (psi)	A_{WALLS} (ft^2)	Stress (psi)
3	1010	1010	280.1	25.0	285.8	24.5
2	957	1967	280.1	48.8	285.8	47.8
1	504	2471	335.2	51.2	289.7	59.2

> 50 PSI NG

DETAILED ANALYSIS REQ'D

EQE INTERNATIONAL

SHEET NO. 20

JOB NO. ______ JOB ______ BY ______ DATE ______

CALC. NO. ______ SUBJECT ______ CHK'D ______ DATE ______

REINF. RATIO OF PRECAST CONC WALLS

HORIZ - #4@10" OC 7" & 8" WALLS

VERT - #4@12" OC do

$$\rho_{HORIZ} = \frac{0.24}{7(12)} = 0.00286 > 0.0025 \text{ OK}$$

$$\rho_{VERT} = \frac{0.20}{7(12)} \quad 0.00238 < 0.0025 \text{ NG}$$

MULTIPLY V BY 1.25

SEISMIC FORCE CALCULATION BASED ON SB1953 (STATIC PROCEDURE)

STORY	Weight (kips)	Height (ft)	H (ft)	$W_i*H_i^k$ X-Dir.	$W_i*H_i^k$ Y-Dir.	F% X-Dir.	F% Y-Dir.	Fx (kips)	Fy (kips)
ROOF	5,770	10.5	31.50	181,755	181,755	44.4%	44.4%	**1700.7**	**1700.7**
3FL	7,134	10.5	21.00	149,814	149,814	36.6%	36.6%	**1401.8**	**1401.8**
2FL	7,438	10.5	10.50	78,099	78,099	19.1%	19.1%	**730.8**	**730.8**
BASELINE	0	0	0						
TOTALS	20,342	31.5 ft		409,668	409,668	1.0	1.0	3833	3833
above grad	**20,342**	**31.5** ft							

Overturning Moment Mx (ft-k)	Overturning Moment My (ft-k)
0	0
17,857	**17,857**
50,434	**83,011**

S.F. for Overturning
0.75

Resisting Moment Mx (ft-k)	Resisting Moment My (ft-k)
1,540,907	**1,006,929**
O.K.	**O.K.**

k X-Dir.	k Y-Dir.
1	1

Building Dimension		
Lx=	202	ft
Ly=	132	ft

Building Type	Coeff. (from SB1953)	
OT	Av=	0.4
MF: Moment Frame	Aa=	0.4
OT: Other	R=	4.5
C_1= 0	S=	1.2
Steel Frame: 0.035	Ca=	1.2
Conc. Frame: 0.030	Cd=	4

Base Shear Calculation

T (sec)	Cs (Av)	Cs (Aa)	V / W	V (kips)
Tb-X= 0.178	0.2697	0.1884	18.84%	
Ta-X= 0.111	0.3699	0.1884	18.84%	
Tb-Y= 0.178	0.2697	0.1884	18.84%	
Ta-Y= 0.137	0.3210	0.1884	18.84%	
Tused-X= 0.133	0.3275	0.1884	18.84%	**3833**
Tused-Y= 0.165	0.2842	0.1884	18.84%	~~**3833**~~

MULTIPLIED BY 1.25 FOR CONFINEMENT & BY 1.25 FOR ρ_{min}

Drift Ratio Check

	Calculated Elastic DR	Actual Elastic DR	Plastic Drift Ratio	Allowable Drift Ratio	
X-Dir.	0.00169	0.002	**0.007**	**0.0133**	**O.K.**
Y-Dir.	0.00072	0.001	**0.003**	**0.0133**	**O.K.**

SJMC SHEAR WALL ANALYSIS

Height 10.5
Fy 40
F'c 3000

Story	Pier	Shear (k)	Length (ft)	Thick (in)	As (in2)	phi Vc (k)	phi Vs (k)	Vn (k)	D/C
STORY1	P001	16.67	5.5	7.00	0.24	34.4	44.9	79.3	0.21
STORY1	P002	16.71	5.5	7.00	0.24	34.4	44.9	79.3	0.21
STORY1	P003	16.74	5.5	7.00	0.24	34.4	44.9	79.3	0.21
STORY1	P004	14.07	5	7.00	0.24	31.3	40.8	72.1	0.20
STORY1	P005	14.3	5	7.00	0.24	31.3	40.8	72.1	0.20
STORY1	P006	13.97	5	7.00	0.24	31.3	40.8	72.1	0.19
STORY1	P007	14.59	5	7.00	0.24	31.3	40.8	72.1	0.20
STORY1	P008	90.1	9	8.00	0.24	64.4	73.4	137.8	0.65
STORY1	P009	55.36	9	7.00	0.24	56.3	73.4	129.7	0.43
STORY1	P010	112.27	17	7.00	0.24	106.3	138.7	245.0	0.46
STORY1	P011	115.69	17.5	7.00	0.24	109.4	142.8	252.2	0.46
STORY1	P012	102.41	16.17	7.00	0.24	101.1	131.9	233.1	0.44
STORY1	P013	121.97	18	7.00	0.24	112.6	146.9	259.4	0.47
STORY1	P014	105.79	16.5	7.00	0.24	103.2	134.6	237.8	0.44
STORY1	P015	115.17	17.33	7.00	0.24	108.4	141.4	249.8	0.46
STORY1	P016	82.78	11	7.00	0.24	68.8	89.8	158.5	0.52
STORY1	P017	29.95	6	7.00	0.24	37.5	49.0	86.5	0.35
STORY1	P018	33.13	8.17	7.00	0.24	51.1	66.7	117.8	0.28
STORY1	P019	116.78	17.67	7.00	0.24	110.5	144.2	254.7	0.46
STORY1	P020	96.15	15.33	7.00	0.24	95.9	125.1	221.0	0.44
STORY1	P021	14.63	4.5	7.00	0.24	28.1	36.7	64.9	0.23
STORY1	P022	151.63	16	7.00	0.24	100.1	130.6	230.6	0.66
STORY1	P023	196.27	20.67	7.00	0.24	129.3	168.7	297.9	0.66
STORY1	P024	15.36	5.5	7.00	0.24	34.4	44.9	79.3	0.19
STORY1	P025	15.36	5.5	7.00	0.24	34.4	44.9	79.3	0.19
STORY1	P026	155.27	15	8.00	0.24	107.3	122.4	229.7	0.68
STORY1	P027	26.84	4.5	8.00	0.24	32.2	36.7	68.9	0.39
STORY1	P028	15.73	5.5	7.00	0.24	34.4	44.9	79.3	0.20
STORY1	P029	16.04	5.5	7.00	0.24	34.4	44.9	79.3	0.20
STORY1	P030	149.43	17.42	8.00	0.24	124.6	142.1	266.8	0.56
STORY1	P031	58.61	13.5	4.93	0.24	59.5	110.2	169.7	0.35
STORY1	P032	38.58	8.997	7.00	0.24	56.3	73.4	129.7	0.30
STORY1	P033	108.19	17	7.00	0.24	106.3	138.7	245.0	0.44

STORY1	P034	37.28	8.5	7.00	0.24	53.2	69.4	122.5	0.30
STORY1	P035	98.23	14.67	8.00	0.24	105.0	119.7	224.7	0.44
STORY1	P036	197.43	20.67	7.00	0.24	129.3	168.7	297.9	0.66
STORY1	P037	467.86	39	8.00	0.24	279.0	318.2	597.3	0.78
STORY1	P038	49.92	10	7.00	0.24	62.5	81.6	144.1	0.35
STORY1	P039	118.61	18	7.00	0.24	112.6	146.9	259.4	0.46
STORY1	P040	114.71	17.5	7.00	0.24	109.4	142.8	252.2	0.45
STORY1	P041	116.34	17.5	7.00	0.24	109.4	142.8	252.2	0.46
STORY1	P042	117.94	18	7.00	0.24	112.6	146.9	259.4	0.45
STORY1	P043	112.54	17.5	7.00	0.24	109.4	142.8	252.2	0.45
STORY1	P044	120.03	18	7.00	0.24	112.6	146.9	259.4	0.46
STORY1	P045	52.82	8.5	7.00	0.24	53.2	69.4	122.5	0.43
STORY1	P046	20.68	4	8.00	0.24	28.6	32.6	61.3	0.34
STORY1	P047	30.61	5	8.00	0.24	35.8	40.8	76.6	0.40
STORY1	P048	13.64	5	7.00	0.24	31.3	40.8	72.1	0.19
STORY1	P049	13.86	5	7.00	0.24	31.3	40.8	72.1	0.19
STORY1	P050	13.98	5	7.00	0.24	31.3	40.8	72.1	0.19
STORY1	P051	13.84	5	7.00	0.24	31.3	40.8	72.1	0.19
STORY1	P052	13.93	5	7.00	0.24	31.3	40.8	72.1	0.19
STORY1	P053	13.83	5	7.00	0.24	31.3	40.8	72.1	0.19
STORY1	P054	15.05	5	7.00	0.24	31.3	40.8	72.1	0.21
STORY1	P055	17.19	4	7.00	0.24	25.0	32.6	57.7	0.30
STORY1	P056	27.71	5	8.00	0.24	35.8	40.8	76.6	0.36
STORY1	P057	189.52	26.83	8.00	0.24	192.0	218.9	410.9	0.46
STORY1	P058	87.23	12.92	8.00	0.24	92.4	105.4	197.9	0.44
STORY1	P059	121.5	24.5	7.97	0.24	174.5	199.9	374.4	0.32
STORY1	P060	232.65	23.75	8.00	0.24	169.9	193.8	363.7	0.64
STORY1	P061	39.13	7.5	8.00	0.24	53.7	61.2	114.9	0.34
STORY1	P062	28.76	6	8.00	0.24	42.9	49.0	91.9	0.31
STORY1	P063	257.82	27.17	8.00	0.24	194.4	221.7	416.1	0.62
STORY1	P066	88.94	10.5	8.00	0.24	75.1	85.7	160.8	0.55
STORY1	P067	161.32	17.33	8.00	0.24	124.0	141.4	265.4	0.61
STORY1	P068	174.66	19.17	8.00	0.24	137.2	156.4	293.6	0.59
STORY1	P069	71.67	10.5	7.00	0.24	65.7	85.7	151.3	0.47
STORY1	P070	85.21	14.17	7.00	0.24	88.6	115.6	204.2	0.42
STORY1	P071	36.67	9	7.00	0.24	56.3	73.4	129.7	0.28
STORY1	P072	15.94	5.5	7.00	0.24	34.4	44.9	79.3	0.20
STORY1	P073	52.76	11.5	7.00	0.24	71.9	93.8	165.8	0.32
STORY1	P074	30.92	6	7.00	0.24	37.5	49.0	86.5	0.36
STORY1	P075	37.81	8.17	7.00	0.24	51.1	66.7	117.8	0.32
STORY1	P076	37.5	9.5	7.00	0.24	59.4	77.5	136.9	0.27
STORY1	P077	25.86	7.25	7.00	0.24	45.3	59.2	104.5	0.25

STORY1	P078	49.91	11.333	7.00	0.24	70.9	92.5	163.3	0.31
STORY1	P079	40.28	9.67	7.00	0.24	60.5	78.9	139.4	0.29
STORY1	P080	31.66	6	7.00	0.24	37.5	49.0	86.5	0.37
STORY1	P081	63.14	11	7.00	0.24	68.8	89.8	158.5	0.40
STORY1	P082	97.45	17.083	7.00	0.24	106.8	139.4	246.2	0.40
STORY1	P083	227.07	26.75	7.00	0.24	167.3	218.3	385.6	0.59
STORY1	P084	12.46	5	7.00	0.24	31.3	40.8	72.1	0.17
STORY1	P085	13.04	5	7.00	0.24	31.3	40.8	72.1	0.18
STORY1	P086	15.51	5	7.00	0.24	31.3	40.8	72.1	0.22
STORY1	P087	15.59	5	7.00	0.24	31.3	40.8	72.1	0.22
STORY1	P088	185.28	17.5	7.00	0.24	109.4	142.8	252.2	0.73
STORY1	P090	29.03	6.42	7.00	0.24	40.1	52.4	92.5	0.31
STORY1	P091	69.01	11	7.00	0.24	68.8	89.8	158.5	0.44
STORY1	P092	64.72	9	7.00	0.24	56.3	73.4	129.7	0.50
STORY1	P093	103.64	11.83	7.00	0.24	74.0	96.5	170.5	0.61
STORY1	P094	36.02	7	7.00	0.24	43.8	57.1	100.9	0.36
STORY1	P095	50.08	8.75	7.00	0.24	54.7	71.4	126.1	0.40
STORY1	P098	98.54	9.92	7.00	0.24	62.0	80.9	143.0	0.69
STORY1	P099	114.97	10.5	7.00	0.24	65.7	85.7	151.3	0.76
STORY1	P100	157.45	17.33	7.00	0.24	108.4	141.4	249.8	0.63
STORY1	P101	105.17	11.75	7.00	0.24	73.5	95.9	169.4	0.62
STORY1	P102	250.23	17.33	8.00	0.24	124.0	141.4	265.4	0.94
STORY1	P103	186.07	16.83	8.00	0.24	120.4	137.3	257.7	0.72
STORY1	P104	178.43	11.5	8.00	0.24	82.3	93.8	176.1	1.01
STORY1	P105	20.75	5	7.00	0.24	31.3	40.8	72.1	0.29
STORY1	P106	20.66	5	7.00	0.24	31.3	40.8	72.1	0.29
STORY1	P107	20.76	5	7.00	0.24	31.3	40.8	72.1	0.29
STORY1	P089A	70	7	7.00	0.24	43.8	57.1	100.9	0.69
STORY1	P089B	121.68	13	7.00	0.24	81.3	106.1	187.4	0.65
STORY1	P096A	24.14	3.67	7.00	0.24	23.0	29.9	52.9	0.46
STORY1	P096B	92.7	9.67	7.00	0.24	60.5	78.9	139.4	0.67
STORY2	P001	2.85	5.5	7.00	0.24	34.4	44.9	79.3	0.04
STORY2	P002	2.3	5.5	7.00	0.24	34.4	44.9	79.3	0.03
STORY2	P003	2.39	5.5	7.00	0.24	34.4	44.9	79.3	0.03
STORY2	P004	2.74	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P005	3.7	5	7.00	0.24	31.3	40.8	72.1	0.05
STORY2	P006	3.3	5	7.00	0.24	31.3	40.8	72.1	0.05
STORY2	P007	4.44	5	7.00	0.24	31.3	40.8	72.1	0.06
STORY2	P008	96.74	9	8.00	0.24	64.4	73.4	137.8	0.70
STORY2	P009	48.82	9	7.00	0.24	56.3	73.4	129.7	0.38
STORY2	P010	78.42	17	7.00	0.24	106.3	138.7	245.0	0.32
STORY2	P011	80.01	17.5	7.00	0.24	109.4	142.8	252.2	0.32

STORY2	P012	65.31	16.17	7.00	0.24	101.1	131.9	233.1	0.28
STORY2	P013	85.7	18	7.00	0.24	112.6	146.9	259.4	0.33
STORY2	P014	68.92	16.5	7.00	0.24	103.2	134.6	237.8	0.29
STORY2	P015	78.76	17.33	7.00	0.24	108.4	141.4	249.8	0.32
STORY2	P016	74.85	11	7.00	0.24	68.8	89.8	158.5	0.47
STORY2	P017	13.26	6	7.00	0.24	37.5	49.0	86.5	0.15
STORY2	P018	7.35	8.17	7.00	0.24	51.1	66.7	117.8	0.06
STORY2	P019	83.43	17.67	7.00	0.24	110.5	144.2	254.7	0.33
STORY2	P020	67.62	15.33	7.00	0.24	95.9	125.1	221.0	0.31
STORY2	P021	7.32	4.5	7.00	0.24	28.1	36.7	64.9	0.11
STORY2	P022	167.22	16	7.00	0.24	100.1	130.6	230.6	0.73
STORY2	P023	221.58	20.67	7.00	0.24	129.3	168.7	297.9	0.74
STORY2	P024	1.05	5.5	7.00	0.24	34.4	44.9	79.3	0.01
STORY2	P025	1.05	5.5	7.00	0.24	34.4	44.9	79.3	0.01
STORY2	P026	211.85	15	8.00	0.24	107.3	122.4	229.7	0.92
STORY2	P028	2.2	5.5	7.00	0.24	34.4	44.9	79.3	0.03
STORY2	P029	2.67	5.5	7.00	0.24	34.4	44.9	79.3	0.03
STORY2	P030	131.29	17.42	8.00	0.24	124.6	142.1	266.8	0.49
STORY2	P031	94.83	15.75	7.00	0.24	98.5	128.5	227.0	0.42
STORY2	P032	10	8.997	7.00	0.24	56.3	73.4	129.7	0.08
STORY2	P033	72.47	17	7.00	0.24	106.3	138.7	245.0	0.30
STORY2	P034	7.14	8.5	7.00	0.24	53.2	69.4	122.5	0.06
STORY2	P035	57.66	14.67	8.00	0.24	105.0	119.7	224.7	0.26
STORY2	P036	232.17	20.67	7.00	0.24	129.3	168.7	297.9	0.78
STORY2	P037	587.59	39	8.00	0.24	279.0	318.2	597.3	0.98
STORY2	P038	23.33	10	7.00	0.24	62.5	81.6	144.1	0.16
STORY2	P039	83.52	18	7.00	0.24	112.6	146.9	259.4	0.32
STORY2	P040	75.8	17.5	7.00	0.24	109.4	142.8	252.2	0.30
STORY2	P041	80.19	17.5	7.00	0.24	109.4	142.8	252.2	0.32
STORY2	P042	82.07	18	7.00	0.24	112.6	146.9	259.4	0.32
STORY2	P043	74.97	17.5	7.00	0.24	109.4	142.8	252.2	0.30
STORY2	P044	81.56	18	7.00	0.24	112.6	146.9	259.4	0.31
STORY2	P045	36.3	8.5	7.00	0.24	53.2	69.4	122.5	0.30
STORY2	P046	10.81	4	8.00	0.24	28.6	32.6	61.3	0.18
STORY2	P047	14.39	5	8.00	0.24	35.8	40.8	76.6	0.19
STORY2	P048	3.09	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P049	2.91	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P050	3.14	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P051	2.88	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P052	3.05	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P053	2.87	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P054	5.08	5	7.00	0.24	31.3	40.8	72.1	0.07

STORY2	P055	10.22	4	7.00	0.24	25.0	32.6	57.7	0.18
STORY2	P056	15.78	5	8.00	0.24	35.8	40.8	76.6	0.21
STORY2	P057	313.63	26.83	8.00	0.24	192.0	218.9	410.9	0.76
STORY2	P058	68.86	12.92	8.00	0.24	92.4	105.4	197.9	0.35
STORY2	P059	150.93	16	8.00	0.24	114.5	130.6	245.0	0.62
STORY2	P063	282.64	27.17	8.00	0.24	194.4	221.7	416.1	0.68
STORY2	P064	7.61	2.5	8.00	0.24	17.9	20.4	38.3	0.20
STORY2	P065	25.28	4.5	8.00	0.24	32.2	36.7	68.9	0.37
STORY2	P067	174.2	17.33	8.00	0.24	124.0	141.4	265.4	0.66
STORY2	P068	162.07	17.42	8.00	0.24	124.6	142.1	266.8	0.61
STORY2	P069	70.55	10.5	7.00	0.24	65.7	85.7	151.3	0.47
STORY2	P070	64.56	14.17	7.00	0.24	88.6	115.6	204.2	0.32
STORY2	P071	9.26	9	7.00	0.24	56.3	73.4	129.7	0.07
STORY2	P072	4.35	5.5	7.00	0.24	34.4	44.9	79.3	0.05
STORY2	P073	16.93	11.5	7.00	0.24	71.9	93.8	165.8	0.10
STORY2	P074	16.93	6	7.00	0.24	37.5	49.0	86.5	0.20
STORY2	P075	15.78	8.17	7.00	0.24	51.1	66.7	117.8	0.13
STORY2	P076	9.02	9.5	7.00	0.24	59.4	77.5	136.9	0.07
STORY2	P077	2.27	7.25	7.00	0.24	45.3	59.2	104.5	0.02
STORY2	P078	16.53	11.333	7.00	0.24	70.9	92.5	163.3	0.10
STORY2	P079	7.74	9.67	7.00	0.24	60.5	78.9	139.4	0.06
STORY2	P080	20.42	6	7.00	0.24	37.5	49.0	86.5	0.24
STORY2	P081	43.5	11	7.00	0.24	68.8	89.8	158.5	0.27
STORY2	P082	58.13	17.083	7.00	0.24	106.8	139.4	246.2	0.24
STORY2	P083	240.6	26.75	7.00	0.24	167.3	218.3	385.6	0.62
STORY2	P084	2.97	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P085	3.38	5	7.00	0.24	31.3	40.8	72.1	0.05
STORY2	P086	3.1	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY2	P087	4.17	5	7.00	0.24	31.3	40.8	72.1	0.06
STORY2	P088	202.61	17.5	7.00	0.24	109.4	142.8	252.2	0.80
STORY2	P089	255.93	24.17	7.00	0.24	151.1	197.2	348.4	0.73
STORY2	P090	5.64	6.42	7.00	0.24	40.1	52.4	92.5	0.06
STORY2	P091	23.29	11	7.00	0.24	68.8	89.8	158.5	0.15
STORY2	P092	30.93	9	7.00	0.24	56.3	73.4	129.7	0.24
STORY2	P093	65.85	11.83	7.00	0.24	74.0	96.5	170.5	0.39
STORY2	P094	6.02	7	7.00	0.24	43.8	57.1	100.9	0.06
STORY2	P095	7.64	8.75	7.00	0.24	54.7	71.4	126.1	0.06
STORY2	P096	134.29	16.67	7.00	0.24	104.2	136.0	240.3	0.56
STORY2	P097	180.52	17.5	7.00	0.24	109.4	142.8	252.2	0.72
STORY2	P100	101.91	17.33	7.00	0.24	108.4	141.4	249.8	0.41
STORY2	P101	71.73	11.75	7.00	0.24	73.5	95.9	169.4	0.42
STORY2	P102	247.59	17.33	8.00	0.24	124.0	141.4	265.4	0.93

STORY2	P103	128.5	16.83	8.00	0.24	120.4	137.3	257.7	0.50
STORY2	P104	201.2	11.5	8.00	0.24	82.3	93.8	176.1	1.14
STORY2	P105	4.57	5	7.00	0.24	31.3	40.8	72.1	0.06
STORY2	P106	4.41	5	7.00	0.24	31.3	40.8	72.1	0.06
STORY2	P107	4.62	5	7.00	0.24	31.3	40.8	72.1	0.06
STORY3	P001	5.1	5.5	7.00	0.24	34.4	44.9	79.3	0.06
STORY3	P002	3.45	5.5	7.00	0.24	34.4	44.9	79.3	0.04
STORY3	P003	3.77	5.5	7.00	0.24	34.4	44.9	79.3	0.05
STORY3	P004	3.27	5	7.00	0.24	31.3	40.8	72.1	0.05
STORY3	P005	5.43	5	7.00	0.24	31.3	40.8	72.1	0.08
STORY3	P006	4.61	5	7.00	0.24	31.3	40.8	72.1	0.06
STORY3	P007	7.07	5	7.00	0.24	31.3	40.8	72.1	0.10
STORY3	P008	74.78	9	8.00	0.24	64.4	73.4	137.8	0.54
STORY3	P009	51.79	9	7.00	0.24	56.3	73.4	129.7	0.40
STORY3	P010	22.19	17	7.00	0.24	106.3	138.7	245.0	0.09
STORY3	P011	21.28	17.5	7.00	0.24	109.4	142.8	252.2	0.08
STORY3	P012	15.21	16.17	7.00	0.24	101.1	131.9	233.1	0.07
STORY3	P013	24.28	18	7.00	0.24	112.6	146.9	259.4	0.09
STORY3	P014	17.09	16.5	7.00	0.24	103.2	134.6	237.8	0.07
STORY3	P015	27.78	17.33	7.00	0.24	108.4	141.4	249.8	0.11
STORY3	P016	50.21	11	7.00	0.24	68.8	89.8	158.5	0.32
STORY3	P017	18.05	6	7.00	0.24	37.5	49.0	86.5	0.21
STORY3	P018	7.06	8.17	7.00	0.24	51.1	66.7	117.8	0.06
STORY3	P019	20.95	17.67	7.00	0.24	110.5	144.2	254.7	0.08
STORY3	P020	30.76	15.33	7.00	0.24	95.9	125.1	221.0	0.14
STORY3	P021	13.47	4.5	7.00	0.24	28.1	36.7	64.9	0.21
STORY3	P022	102.83	16	7.00	0.24	100.1	130.6	230.6	0.45
STORY3	P023	138.29	20.67	7.00	0.24	129.3	168.7	297.9	0.46
STORY3	P024	0.52	5.5	7.00	0.24	34.4	44.9	79.3	0.01
STORY3	P025	0.52	5.5	7.00	0.24	34.4	44.9	79.3	0.01
STORY3	P026	152.04	15	8.00	0.24	107.3	122.4	229.7	0.66
STORY3	P028	3.16	5.5	7.00	0.24	34.4	44.9	79.3	0.04
STORY3	P029	3.74	5.5	7.00	0.24	34.4	44.9	79.3	0.05
STORY3	P030	67.29	17.42	8.00	0.24	124.6	142.1	266.8	0.25
STORY3	P031	18.23	15.75	7.00	0.24	98.5	128.5	227.0	0.08
STORY3	P032	6.3	8.997	7.00	0.24	56.3	73.4	129.7	0.05
STORY3	P033	13.53	17	7.00	0.24	106.3	138.7	245.0	0.06
STORY3	P034	19.51	8.5	7.00	0.24	53.2	69.4	122.5	0.16
STORY3	P035	12.97	14.67	8.00	0.24	105.0	119.7	224.7	0.06
STORY3	P036	174.17	20.67	7.00	0.24	129.3	168.7	297.9	0.58
STORY3	P037	454.46	39	8.00	0.24	279.0	318.2	597.3	0.76
STORY3	P038	37.97	10	7.00	0.24	62.5	81.6	144.1	0.26

STORY3	P039	17.98	18	7.00	0.24	112.6	146.9	259.4	0.07
STORY3	P040	17.5	17.5	7.00	0.24	109.4	142.8	252.2	0.07
STORY3	P041	24.29	17.5	7.00	0.24	109.4	142.8	252.2	0.10
STORY3	P042	19.27	18	7.00	0.24	112.6	146.9	259.4	0.07
STORY3	P043	16.42	17.5	7.00	0.24	109.4	142.8	252.2	0.07
STORY3	P044	20.32	18	7.00	0.24	112.6	146.9	259.4	0.08
STORY3	P045	34.33	8.5	7.00	0.24	53.2	69.4	122.5	0.28
STORY3	P046	18.49	4	8.00	0.24	28.6	32.6	61.3	0.30
STORY3	P047	24.2	5	8.00	0.24	35.8	40.8	76.6	0.32
STORY3	P048	3.74	5	7.00	0.24	31.3	40.8	72.1	0.05
STORY3	P049	2.79	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY3	P050	3.25	5	7.00	0.24	31.3	40.8	72.1	0.05
STORY3	P051	2.78	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY3	P052	3.05	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY3	P053	2.79	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY3	P054	7.6	5	7.00	0.24	31.3	40.8	72.1	0.11
STORY3	P055	8.33	4	7.00	0.24	25.0	32.6	57.7	0.14
STORY3	P056	16.76	5	8.00	0.24	35.8	40.8	76.6	0.22
STORY3	P057	99.82	17.42	8.00	0.24	124.6	142.1	266.8	0.37
STORY3	P058	52.61	12.92	8.00	0.24	92.4	105.4	197.9	0.27
STORY3	P059	112.61	16	8.00	0.24	114.5	130.6	245.0	0.46
STORY3	P063	193.01	27.17	8.00	0.24	194.4	221.7	416.1	0.46
STORY3	P064	22.06	2.5	8.00	0.24	17.9	20.4	38.3	0.58
STORY3	P065	9.21	4.5	8.00	0.24	32.2	36.7	68.9	0.13
STORY3	P067	116.48	17.33	8.00	0.24	124.0	141.4	265.4	0.44
STORY3	P068	97.13	17.42	8.00	0.24	124.6	142.1	266.8	0.36
STORY3	P069	74.65	10.5	7.00	0.24	65.7	85.7	151.3	0.49
STORY3	P070	36.95	14.17	7.00	0.24	88.6	115.6	204.2	0.18
STORY3	P071	10.87	9	7.00	0.24	56.3	73.4	129.7	0.08
STORY3	P072	7.95	5.5	7.00	0.24	34.4	44.9	79.3	0.10
STORY3	P073	9.23	11.5	7.00	0.24	71.9	93.8	165.8	0.06
STORY3	P074	19.53	6	7.00	0.24	37.5	49.0	86.5	0.23
STORY3	P075	10.9	8.17	7.00	0.24	51.1	66.7	117.8	0.09
STORY3	P076	15.81	9.5	7.00	0.24	59.4	77.5	136.9	0.12
STORY3	P077	12.48	7.25	7.00	0.24	45.3	59.2	104.5	0.12
STORY3	P078	15.52	11.333	7.00	0.24	70.9	92.5	163.3	0.10
STORY3	P079	21.31	9.67	7.00	0.24	60.5	78.9	139.4	0.15
STORY3	P080	25.05	6	7.00	0.24	37.5	49.0	86.5	0.29
STORY3	P081	34.61	11	7.00	0.24	68.8	89.8	158.5	0.22
STORY3	P082	11.88	17.083	7.00	0.24	106.8	139.4	246.2	0.05
STORY3	P083	159.82	26.75	7.00	0.24	167.3	218.3	385.6	0.41
STORY3	P084	3.24	5	7.00	0.24	31.3	40.8	72.1	0.04

STORY3	P085	3.54	5	7.00	0.24	31.3	40.8	72.1	0.05
STORY3	P086	3.19	5	7.00	0.24	31.3	40.8	72.1	0.04
STORY3	P087	5.18	5	7.00	0.24	31.3	40.8	72.1	0.07
STORY3	P088	116.12	17.5	7.00	0.24	109.4	142.8	252.2	0.46
STORY3	P089	137.68	24.17	7.00	0.24	151.1	197.2	348.4	0.40
STORY3	P090	17.69	6.42	7.00	0.24	40.1	52.4	92.5	0.19
STORY3	P091	27.01	11	7.00	0.24	68.8	89.8	158.5	0.17
STORY3	P092	22.56	9	7.00	0.24	56.3	73.4	129.7	0.17
STORY3	P093	27.85	11.83	7.00	0.24	74.0	96.5	170.5	0.16
STORY3	P094	27.7	7	7.00	0.24	43.8	57.1	100.9	0.27
STORY3	P095	14.14	8.75	7.00	0.24	54.7	71.4	126.1	0.11
STORY3	P096	69.89	16.67	7.00	0.24	104.2	136.0	240.3	0.29
STORY3	P097	33.47	17.5	7.00	0.24	109.4	142.8	252.2	0.13
STORY3	P100	19.14	17.33	7.00	0.24	108.4	141.4	249.8	0.08
STORY3	P101	31.83	11.75	7.00	0.24	73.5	95.9	169.4	0.19
STORY3	P102	143.9	17.33	8.00	0.24	124.0	141.4	265.4	0.54
STORY3	P103	75.19	16.83	8.00	0.24	120.4	137.3	257.7	0.29
STORY3	P104	137.2	11.5	8.00	0.24	82.3	93.8	176.1	0.78
STORY3	P105	5.02	5	7.00	0.24	31.3	40.8	72.1	0.07
STORY3	P106	4.64	5	7.00	0.24	31.3	40.8	72.1	0.06
STORY3	P107	5.97	5	7.00	0.24	31.3	40.8	72.1	0.08

Wou & Partners
NPC2

EQE International

SAN JOSE MEDICAL CENTER

SAN JOSE, CALIFORNIA
Facilities Planning/Programming Consolidation & Expansion
March 13, 2000
Columbia/HCA Project No. TBD
Wou & Partners Inc Project No. 99HPD2

STRUCTURAL NARRATIVE & NARRATIVE CHECKLIST

A. EXISTING CONDITIONS

Of the buildings on the San Jose Medical Center campus, six contain acute care facilities and are affected by SB 1953, i.e., Buildings 100, 200, 300, 400, 500 and 600. Functionally integrated but structurally separated by building joints, these buildings, whose vintage varies from 1923 to 1979 encompass a variety of structural types and materials. This report summarizes the information and data developed to date about these buildings' SPC conditions.

1. BUILDING 100

Designed in 1957, Building 100 is a four-story building. Its roof and floor framing consists of steel deck with concrete topping supported by steel beams and columns. On the south side of the building, the columns are extended for two more floors to form the enclosure structure for the machine room. The foundation of the building consists of spread footings below the steel columns and concrete walls.

The steel framing provides gravity load resistance only. The building's lateral load resistance is provided by interior and exterior concrete shear walls. The shear walls have large window and door openings. The concrete piers between the openings are linked by concrete spandrels.

2. BUILDING 200

Designed in 1940, Building 200 is a four-story reinforced concrete building. No structural drawings are available for this building. Based on EQE's visual observation, the building's roof and floor framing consists of concrete slabs supported by reinforced concrete beams, columns and walls. The foundation of the building most likely consists of spread footings below the concrete columns and walls.

The building's lateral load resistance is provided by the reinforced concrete shear walls. Hospital record shows that a seismic reinforcing program consisting primarily of guniting was implemented in 1982.

3. BUILDING 300

Built in 1923, Building 300 is a five-story reinforced concrete building. Its roof and floor framing consists of one-way slabs supported by reinforced concrete beams and columns. The foundation of the building consists of spread footings below the concrete columns and walls. The building's lateral load resistance is provided by reinforced concrete shear walls.

4. BUILDING 400

Built in 1955, Building 400 is a four-story reinforced concrete building. No structural drawings are available at this time. Based on what was observed at the site, we believe its roof and floor framing are constructed of concrete slabs supported by concrete beams and columns. The foundation of the building appears to consist of spread footings below the concrete columns and walls. The building's lateral load resistance is provided by reinforced concrete shear walls.

5. BUILDING 500

Designed in 1967, Building 500 is a three-story concrete building. Its roof and floor framing consists of one-way concrete slabs supported by concrete beams, columns and bearing walls. The foundation of the building consists of a 2' mat foundation stiffened by concrete grade beams.

The building's lateral load resistance is provided by a combination of precast and cast-in-place reinforced concrete shear walls on the perimeter as well as the interior of the building.

6. BUILDING 600

Designed in 1979, Building 600 is an OSHPD approved two-story steel building (OSHPD Approval No. H0798). Its roof and floor framing consists of steel deck with concrete topping supported by steel beams and columns. Ground floor framing is concrete slab on grade supported by grade beams. Its foundation consists of 36" diameter caissons linked by concrete grade beams in both directions.

The building's lateral load resistance is provided by steel moment resisting frames, with the bases of the columns rigidly fixed to the grade beams. An inspection of the original design drawings indicates that every single beam-column connection in the building was designed to be moment resisting. The reasons for such a conservative design are not readily apparent. On the positive side, this renders the building structural highly redundant and very stiff against seismic forces. On the negative side, the bi-axial stress condition at the beam-column connections may be conducive to such structural problems as weak axis bending and column instability.

B. SPECIAL CONSIDERATIONS

A preliminary evaluation of the structural conditions of the existing buildings that are subject to SB 1953 regulations has been performed by EQE, with the goal of ascertaining the SPC classification of each of the subject buildings and identifying possible structural options for the SB 1953 compliance. This section summarizes the procedures and findings of the preliminary evaluation.

1. STRUCTURAL EVALUATION

a) General

For the SPC work, EQE visited the San Jose Medical Center on February 7, 2000, to collect available drawings and conducted a preliminary building walkthrough. The purpose of the site visits was to review and correlate existing structural conditions with those shown on the available building documents and make an inventory of other undocumented structural components. Previously, a separate building walkthrough was conducted by EQE to evaluate the hospital equipment's NPC conditions.

Among the various buildings on the San Jose Medical Center (SJMC) campus, six building structures were identified to contain licensed acute care facilities that are subject to SB 1953 compliance requirements. These are Buildings 100, 200, 300, 400, 500 and 600. These buildings are functionally integrated but structurally separated by building joints. Their vintage varies from 1923 to 1988. Construction materials for these buildings are either concrete or steel. The primary gravity and lateral load resisting system, however, varies from building to building.

i. BUILDING 100

Besides the re-entrant corner on the southwest corner of the building, the building's geometry is relatively regular. Its lateral stiffness, which limits the amount of lateral building movement during an earthquake, is good. The width of building separation between Building 100 and its immediate neighbors is adequate and should be able to prevent pounding between buildings. These positive attributes aside, however, EQE's preliminary analysis indicates that the existing shear walls are generally overstressed under the governing seismic loading.

By OSHPD SB 1953 Regulations, this building should be classified as **SPC 1**, unless structural strengthening measures are undertaken to mitigate the seismic stress deficiencies in the shear walls

ii. BUILDING 200

EQE's preliminary analysis indicates that, in spite of the 1982 seismic reinforcing, the existing shear walls are generally overstressed under the governing seismic loading. By OSHPD SB 1953 Regulations, this building should be classified as **SPC 1**, unless structural strengthening measures are undertaken to mitigate the seismic deficiencies.

iii. BUILDING 300

EQE's preliminary analysis indicates that the existing shear walls are generally overstressed under the governing seismic loading. By OSHPD SB 1953 Regulations, this building should be classified as **SPC 1**, unless structural strengthening measures are undertaken to mitigate the seismic deficiencies.

iv. BUILDING 400

EQE's preliminary analysis indicates that the existing shear walls are generally overstressed under the governing seismic loading. By OSHPD SB 1953 Regulations, this building should be classified as **SPC 1**, unless structural strengthening measures are undertaken to mitigate the seismic deficiencies.

v. BUILDING 500

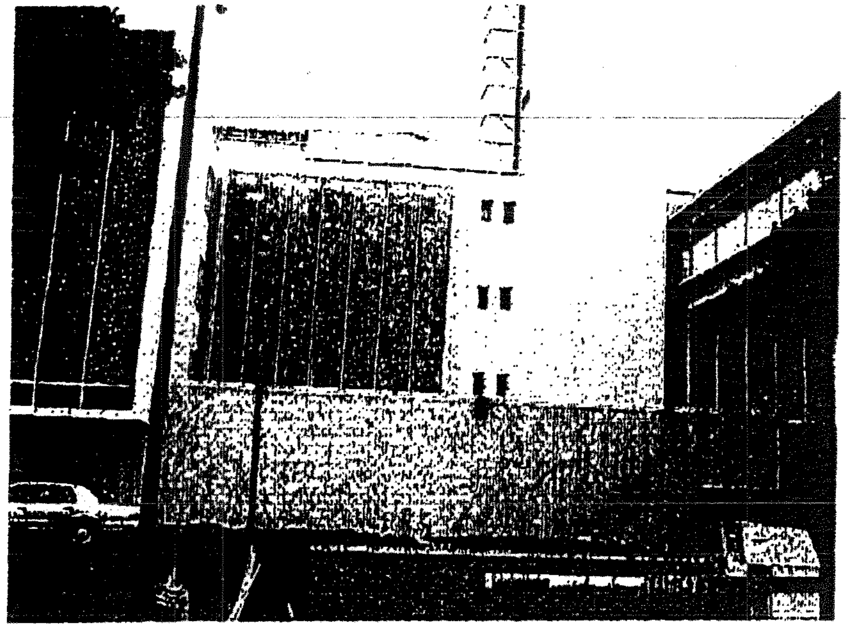
EQE's preliminary analysis indicates that the existing precast concrete shear walls are generally overstressed under the governing seismic loading. In addition, the wall panels' connections are inadequate to meet the OSHPD SB 1953 requirements.

This building should be classified as **SPC 1**, unless structural strengthening measures are undertaken to mitigate the seismic deficiencies.

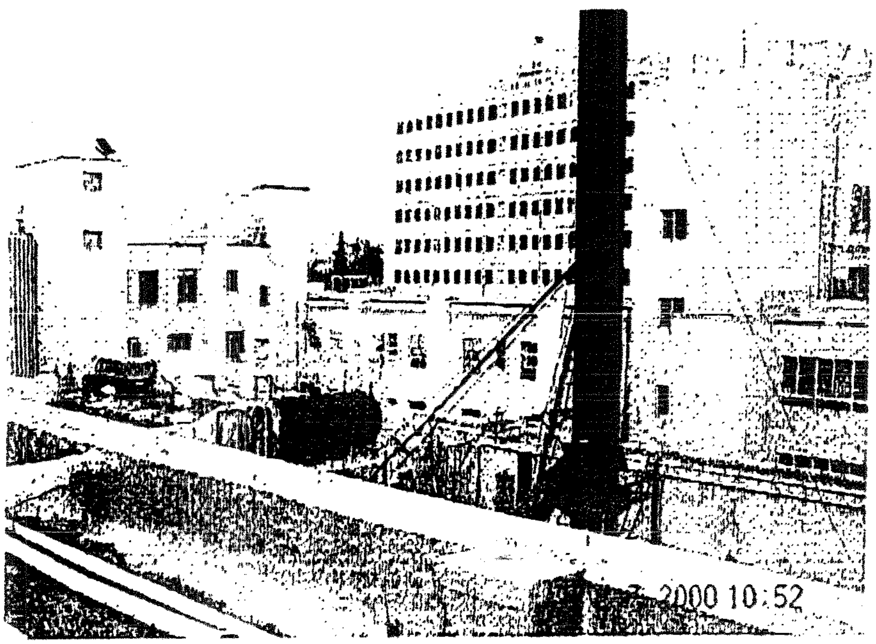
vi. BUILDING 600

Being a steel moment resisting frame building constructed between 1973 and 1994, Building 600 can potentially be classified as **SPC 3**, provided we can demonstrate the adequacy of its beam-column connections. This is typically achieved by performing a structural inspection and testing of a statistical sample of the connections.

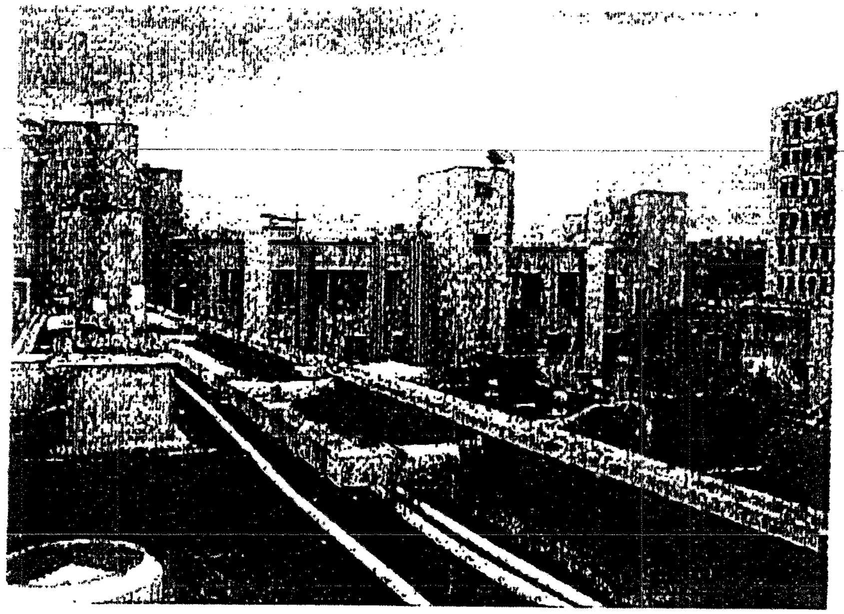
Due to the high redundancy and spatial layout of the existing steel frames in the building, we believe it's highly likely that this building can be proved to be SPC 3 by the detailed analysis.



Photograph 1: Building 100

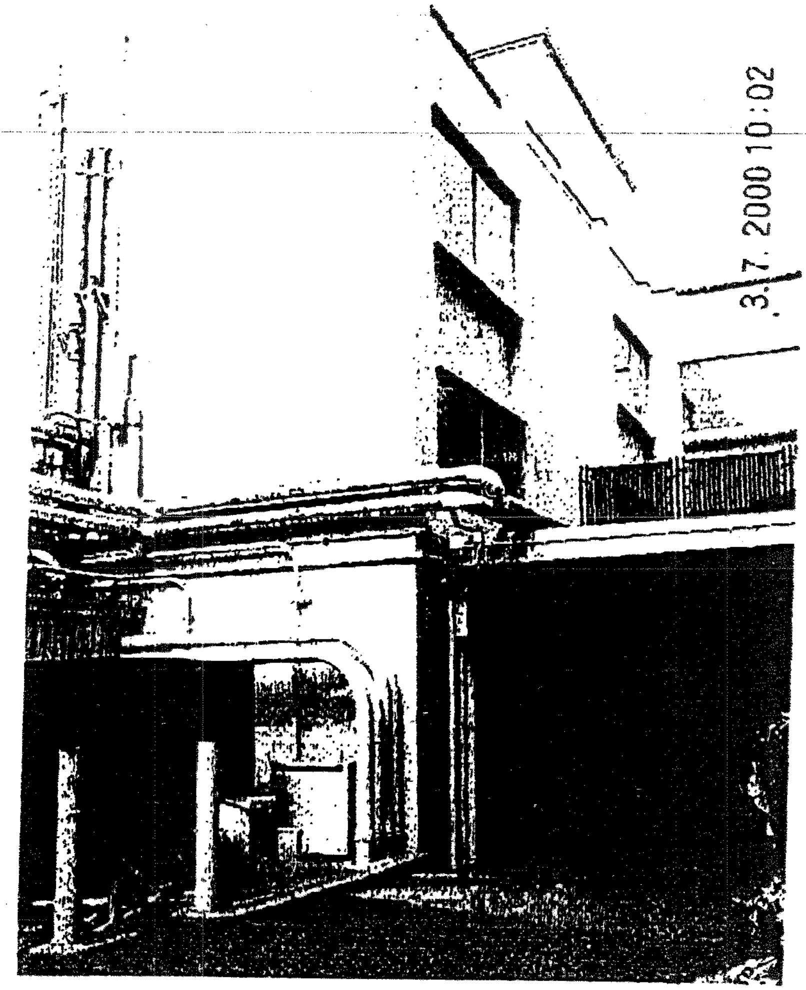


Photograph 2: Building 200

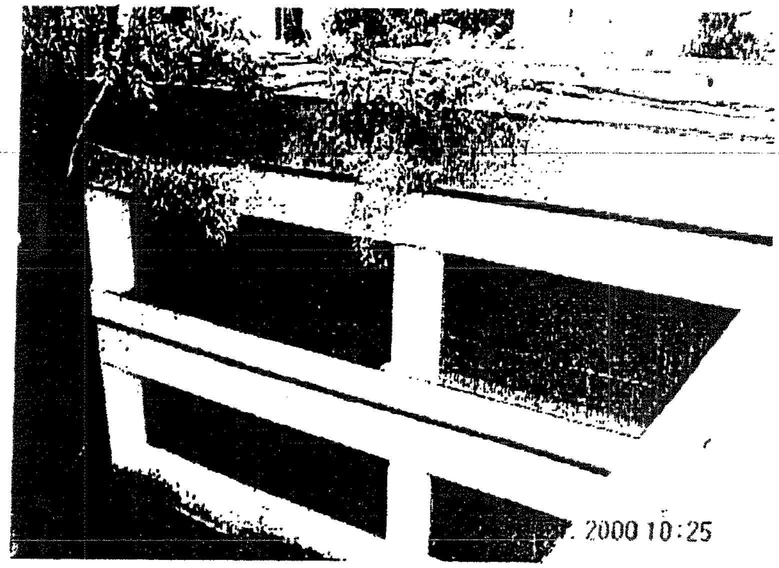


Photograph 3: Building 300

Photograph 4: Building 400



Photograph 5: Building 500



Photograph 6: Building 600

Table 1: SAN JOSE MEDICAL CENTER - BUILDING SUMMARY

BUILDING NAME	Structural System and Type	Design Year	Size	Area	SPC (OSHPD Approval)	Primary Seismic Deficiencies
1. Building 100	Shear Wall Type 9	1957	4 Stories	11,800 sq ft	SPC 1	1 Shear walls overstressed. 2 Inadequate footings for over-turning resistance.
2. Building 200	Shear Wall Type 9	1940	4 Stories	No structural plans	SPC 1	1 Shear walls overstressed. 2 Inadequate footings for over-turning resistance
3. Building 300	Shear Wall Type 9	1923	5 Stories	9,100 sq ft	SPC 1	1 Shear walls overstressed. 2 Inadequate footings for over-turning resistance.
4. Building 400	Shear Wall Type 9	1955	4 Stories	No structural plans	SPC 1	1 Shear walls overstressed. 2 Inadequate footings for over-turning resistance.
5. Building 500	Shear Wall Type 9	1967	3 Story	31,150 sq ft	SPC 1	1. Pre-cast Panel Connection Inadequate. 2. Shear walls overstressed.
6. Building 600	Steel Moment Frame – Type 3	1979	2 Story	13,400 sq ft	SPC 3 (H0798)	Pre-Northridge welded moment frame connections. Inspection and testing of WSMF connection may be required

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STRUCTURAL

Table 1.
Evaluation Summary

Building Name	Structure	Drawing Date	Square Footage	Structure Type	SPC	NPC
Redwoods	Original Building	1923	47,200	Concrete Shear Wall	1	1
	Central Core	1957	2,400	Concrete Shear Wall	1	1
	Main Entrance	1962	7,010	Concrete Shear Wall	~~2~~ 1	1
	Laboratory	1952	3,260	Concrete Moment Frame and Shear Wall	1	1
Emergency	Emergency	1965	2,475	Reinforced Masonry Shear Wall	1	1
	Derby Wing	1926	11,300	Concrete Shear Wall	1	1
West Wing	West Wing	1957	42,650	Concrete Shear Wall	~~2~~ 1	1
	Surgery Addition	1984	1,935	Reinforced Masonry Shear Wall	2	1
East Wing	East Wing	1951	33,300	Concrete Shear Wall	1	1
	Dining Extension	1962	1,020	Concrete Shear Wall	1	1
	Dining Addition	1984	650	Concrete Cantilever Columns	1	1
Landmark Lobby	Landmark Lobby	1986	7,200	Steel Moment Frame	3	1
Rad Lab 600	Radiation Laboratory	1979	34,200	Steel Moment Frame	3	1
Oaks 500	Oaks Building	1968	83,000	Precast and CIP Concrete Shear Walls	~~2~~ 1	1
Chiller Plant	Chiller Plant	1957	1,000	Reinforced Masonry Shear Wall	1	1
Boiler Plant	Boiler Plant	1951	1,540	Concrete Shear Wall	1	1

SB 1953 Hospital Building Evaluations Survey

1. Name of Hospital San Jose Medical Center

2. Hospital Contact: Name Aren Martin Rod Mulaie

   Phone Number 408-729-2820 - 977 -

3. County in which hospital is located Santa Clara

4. Total number of buildings on campus which require an SB 1953 evaluation 9

5. Number of evaluated buildings which fall under each of the following structural performance categories (SPC):

   SPC – 1 6

   SPC – 2 1

   SPC – 3 2

   SPC – 4 0

   SPC – 5 0

6. When do you plan to submit your SB 1953 Compliance Plan to the Office of Statewide Health Planning and Development? (Check one)

   A. Already have submitted __________

   B. No later than January 1, 2001 __________

   C. No later than January 1, 2002 X

7. Please submit estimates for the following if possible:

   A. Estimated cost to meet 2002 nonstructural requirements $ 4 233 732

   B. Estimated cost in 2000 dollars of structural and nonstructural 2008 requirements (Include retrofits, new buildings and remodeling. Do not include financing costs.)
   $____________________

2. NONSTRUCTURAL EVALUATION RESULTS

a) General

This section covers nonstructural components and systems critical to patient care as indicated in Article 11 of the Seismic Evaluation Procedure for Hospital Buildings. The purpose of the nonstructural components evaluation was to identify the Nonstructural Performance Categories (NPC) for each acute-care facility and to develop a rough order of magnitude cost to bring the nonstructural components into compliance. Included was a review of available construction drawings to determine nonstructural components that had received previous OSHPD approval, and a walkthrough and inventory of nonstructural components. This inventory of nonstructural components was used for developing the rough order of magnitude (ROM) cost of the engineering and construction required to obtain OSHPD compliance.

b) Findings

This section summarizes the observations made by EQE International on the primary nonstructural components at the San Jose Medical Center. A one-day building walkthrough was conducted where some of the deficiencies in the nonstructural components were noted.

The critical systems evaluated include communication systems, emergency power systems, bulk medical gas systems, fire alarm systems, finishes and furnishings, mechanical systems, electrical systems and elevators. We have identified the probable NPC class of the each component, should it be upgraded to become compliant. This classification is based on the function or location of the component as defined by OSHPD Article 11, Table 11.1.

1) Communications

The paging system is installed on a plywood sheet, which is not properly anchored into the concrete wall. The PacBell and Motorola units located in the communication room are not properly installed. No OSHPD approval numbers were found for any of the equipment in the communication room, although most seem to be adequately anchored.

2) Emergency Power

An emergency power system exists and there is enough fuel stored on the site for continuous service for a period greater than 72 hours of acute care operation. The two emergency generators are located in the equipment yard. They are adequately anchored. There is a 13,000-gallon underground fuel storage tank, which was recently installed. The fuel day tank was also recently installed and seems to be adequately anchored. Backup starter batteries need to be put in a battery box.

3) **Bulk Medical Gas**

There is a liquid oxygen tank to the west of the main building, which is adequately anchored. A smaller backup oxygen tank is also present which is anchored to the foundation pad. The vaporizer unit also has adequate anchorage. Carbon Dioxide cylinders stored near the oxygen tanks need to be braced. Full gas cylinders are stored in a separate room in racks, which support the cylinders only at the top. These cylinders need to be supported at the bottom as well. No OSHPD approval numbers was found for any of this equipment.

4) **Fire alarm**

The Simplex Fire Controller unit is mounted on a plywood sheet, which is inadequately anchored into the wall. Other fire alarm systems seem to be adequately anchored, even though no OSHPD approval numbers were found for them.

5) **Boilers and HVAC Equipment**

The boiler units do not have adequate anchors. Air Handler equipment located on the roof does not have adequate snubbers. All other equipment located in the Boiler room and on the roof have adequate anchorage/bracing. However, no OSHPD approval numbers were found for them.

6) **Fire Sprinklers**

No sprinklers exist in most rooms in the entire facility with the exception of the Surgicare Building. Sprinklers are present in the corridors and public spaces.

7) **Ceilings**

The facility has a mixture of light suspended and plaster or Gypsum board ceilings with the former being more prevalent in corridors and public areas. Ceilings and lighting fixtures are inadequately braced in most locations.

8) **Onsite Supplies**

The facility does not have emergency water stored on site. There are no holding tanks for sewer water or hookups to allow for the use of transportable sources of water or sanitary wastewater disposal.

9) **Elevators**

Elevator rails for all elevators are not braced. This may cause the elevator to get stuck during an earthquake and disrupt service to the critical care areas.

c) Conclusions

This facility is rated as NPC 1 for the following reasons:

1. Inadequately anchored communications equipment.
2. Inadequately anchored fire alarm equipment.
3. Inadequate anchorage and bracing for bulk medical gas storage.

The above deficiencies must be rectified by the January 1, 2002 to qualify for NPC 2. OSHPD will require justification for equipment that seem to be adequately anchored but do not have OSHPD approval numbers.

Additional deficiencies exist which must be retrofitted by year 2008 to qualify for NPC 3. The bulk of the cost associated with the NPC 3 retrofits in the San Jose Medical Center lies in the bracing and anchoring of the ceilings, light fixtures, sprinkler system, piping and ductwork.

Please refer to Table 2 for a complete documentation of all the NPC deficiencies and recommended retrofit measures. Also included in Table 1 are the itemized cost estimates for each NPC retrofit operation which include engineering costs associated with equipment that seem to be adequately anchored/braced but have no OSHPD approval numbers.

C. RECOMMENDATIONS

1. STRUCTURAL PERFORMANCE

Relevant data and evaluation details for the six subject buildings with acute-care facilities are summarized in Table 1. At this stage of the project, EQE recommends the following structural hazards mitigation concepts for meeting the OSHPD SB 1953 2008 requirements. Depending on the extent of the implementation of these mitigation concepts, the buildings can continue to house the acute care services till 2030 or beyond.

a) Nonconforming Buildings

1) Buildings 100, 200, 300, and 400

These four buildings have reinforced concrete shear walls as their primary lateral load resisting elements. At this stage of the project, the following structural hazards mitigation strategies can be considered for correcting the main identifiable deficiencies in these buildings:

- Strengthen the existing reinforced concrete walls by adding reinforcing steel, dowels, and shotcrete/gunite. An alternative to the wet construction is adding steel braces to the walls.
- Strengthen certain wall footings to enhance their resistance against over-turning.

The horizontal diaphragms and their connection to the walls appear to be sufficient, based on the preliminary data we have. However, more detailed analysis in the ensuing phases may identify a few locations in the buildings that may require some strengthening.

2) Buildings 500

Building 500 have a combination of reinforced concrete and precast concrete shear walls as the primary lateral load resisting elements. At this stage of the project, the following structural hazards mitigation strategies can be considered for correcting the main identifiable deficiencies:

- Reconfigure the connections between the precast concrete panels to the roof and floor diaphragms by adding steel dowels or anchor bolts.
- Strengthen the existing reinforced concrete and precast concrete walls by adding reinforcing steel, dowels, and shotcrete/gunite. An alternative to the wet construction is adding steel braces to the walls.

- Strengthen certain wall footings to enhance their resistance against over-turning.

b) Conforming Building

1) Buildings 600

It is very likely that Building 600 can be classifies as SPC 3. With that, the building can continue its acute care services till 2030 and beyond. To achieve that, we recommend a two step process. First a geotechnical investigation should be commissioned to assess the seismicity of the building site and whether strong earthquakes have occurred in the past. Secondly, if the geotechnical investigation indicates certain seismicity and damage thresholds are exceeded, a structural inspection and testing program for the existing steel beam-column connections should be implemented to ascertain if cracks exit in the connections. Positive findings from these efforts will allow us to classify Building 600 as SPC 3.

2. NON-STRUCTURAL PERFORMANCE

The deficiencies of nonstructural components must be rectified by the January 1, 2002 to qualify for NPC 2. Additional deficiencies exist which must be retrofitted by year 2008 to qualify for NPC 3. The bulk of the cost associated with the NPC 3 retrofits lies in the bracing and anchoring of the ceilings, light fixtures, sprinkler system, piping and ductwork.

SB 1953 Hospital Building Evaluations Survey

1. **Name of Hospital** San Jose Medical Center

2. **Hospital Contact:** **Name** Aaron Martin or Rod Mabie

   Phone Number 408-729-2820 or 408-977-4473

3. **County in which hospital is located** Santa Clara County

4. **Total number of buildings on campus which require an SB 1953 evaluation** NINE (9)

5. **Number of evaluated buildings which fall under each of the following structural performance categories (SPC):**

   SPC – 1 SIX (6)

   SPC – 2 ONE (1)

   SPC – 3 TWO(2)

   SPC – 4 0

   SPC – 5 0

6. **When do you plan to submit your SB 1953 Compliance Plan to the Office of Statewide Health Planning and Development? (Check one)**

   A. **Already have submitted** ________

   B. **No later than January 1, 2001** ________

   C. **No later than January 1, 2002** X **(This Campus May Not Be In Service After 2008)**

7. **Please submit estimates for the following if possible:**

   A. **Estimated cost to meet 2002 nonstructural requirements** $233,732.00

   B. **Estimated cost in 2000 dollars of structural and nonstructural 2008 requirements (Include retrofits, new buildings and remodeling. Do not include financing costs.)** $ 94,233,732.00

SB 1953 Hospital Building Evaluations Survey

1. Name of Hospital RMCSJ

2. Hospital Contact: Name Aaron Martin

   Phone Number 408 729 2820

3. County in which hospital is located Santa Clara

4. Total number of buildings on campus which require an SB 1953 evaluation: 7 Bldgs

5. Number of evaluated buildings which fall under each of the following structural performance categories (SPC):

   SPC – 1 3 Bldgs

   SPC – 2 0

   SPC – 3 3 Bldgs

   SPC – 4 1 Bldg

   SPC – 5 0

6. When do you plan to submit your SB 1953 Compliance Plan to the Office of Statewide Health Planning and Development? (Check one)

   A. Already have submitted yes X

   B. No later than January 1, 2001 ________

   C. No later than January 1, 2002 ________

center

7. Please submit estimates for the following if possible:

   A. Estimated cost to meet 2002 nonstructural requirements $ 259,000 NPC 2 only

   B. Estimated cost in 2000 dollars of structural and nonstructural 2008 requirements (Include retrofits, new buildings and remodeling. Do not include financing costs.)
   $ 83,288,228